PAH Air Handling Unit Catalog

Petra Engineering Industries Co.

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PAH Catalog

Air Handling Unit

SI/IMP

Petra Central Station Air Handling Unit (PAH)

600 - 21,000 L/s
(1,200 - 45,000 CFM)

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Introduction

Petra Engineering Industries Company is a highly established HVAC manufacturing company that produces a wide range of sophisticated, high quality commercial and industrial HVAC equipment. Petra's products meet the requirements of globally recognized standards and procedures

To ensure the highest level of quality all procedures are carried out according to ISO 9001:2015, Quality management systems ISO14001:2015 environmental management system. Also, all Petra's major products are UL and ETL listed. Petra's air handling units are rated and certified in compliance to standard AHRI 430

Petra Air Handling units (PAH) are designed with high quality and efficiency to meet the most demanding requirements. They provide cooling, heating and ventilation to conditioned space. These units are suitable for hotels, hospitals, large halls, banks, super markets and other applications

The flexible modular design allows various section arrangements according to the task requirement This range covers air flow rates from 600 L/s (1,200 CFM) to 21,000 L/s (45,000 CFM) in a single piece unit. Custom designs are available up to 94,000 L/s (200,000 CFM) Units can be constructed as single piece, stacked, side by side or modular, and can fit as a door way

Outstanding Features

Modern Production Technology

The use of modern production technology has made Petra one of the few air-conditioning and ventilation systems manufacturers who uses a combination of cutting-edge production technology & mold press machines
Our CNC machines provide us with highly accurate product parameters, which eliminate the possibility of errors. Our automated production lines benefit us by reducing manufacturing times for any of our products. Our lab, with the latest instruments, gives us the ability to further develop our products in order to satisfy the customer's requirements

Design Flexibility

Petra Air Handling Units meet the same high engineering and performance standards that are characteristics of all Petra air-conditioning systems.
A wide choice of Air Handling Units capacities and options are available to meet the precise design requirements
The units can be constructed in almost any shape and dimension to meet clients restricted spaces in a mechanical room or on top of a roof including (not limited to) modular design and low height application

Always at your service

The units are easy to install and maintain, with a large stock of parts and after sales teams that are always at your service, anytime and anywhere

Option Diversity

A vast variety of filtration, cooling, heating, fan and control options are available for the PAH series, which enhance the unit's performance

Quality

Petra offers the highest quality systems with each unit factory run tested for quality assurance
Due to the fact that any system depends on the quality of its components, we use only the highest quality components
PAH units are produced and tested in an ISO 9001-2015 and ISO 14001-2015 listed manufacturing facility

Creativeness

We are not only dependent on current air-conditioning and ventilation technology, we create the technology our selves, which becomes leading-edge technology in the air-conditioning and ventilation market
We offer the solution to any situation in the area of air-conditioning and ventilation. We care about the health and the satisfaction of our clients

Your Health Is Our Concern

The best health conditions are provided through the provision of high efficiency filters that are easy to clean
In addition, a set of special filters can be added to the unit upon request to remove odors, small particles and bacteria

Easy Installation

Complete factory wiring, easy listing provisions, factory installed options and startup, facilitate quick and easy installation. A complete factory run test is performed on each unit to eliminate potential startup problems

Nomenclature

PAH	H	C	100
Petra Air Handling	Horizontal / Vertical	Cabinet	Nominal Air Flow Rate 100 : 10,000 CFM (4,720 L/s)

Physical Data - SI

	PAH	12	16	24	32	40	50	62	80	100
EVAPORATOR COIL										
Qty						1				
Fins per meter						393				
No. of rows						4				
Total face area	m²	0.2	0.3	0.5	0.6	0.8	0.9	1.2	1.5	1.9
Tube diameter	mm					9.5				
SUPPLY FAN										
Type						DWDI, Forward Curved - Belt Drive				
Qty						1				
Fan model		Petra 280 F	Petra 280 F	Petra 280 F	Petra 315 F	Petra 355 F	Petra 400 F	Petra 450 F	Petra 560 F	Petra 500 F
Nominal air flow rate	L/s	566	755	1,133	1,510	1,888	2,359	2,926	3,775	4,719
Fan Motor										
Type						Induction - TEFC/ODP - IP55 Protection - Class F Insulation				
Qty						1				
Nominal rating	kW	0.55	0.55	0.75	1.5	2.2	2.2	2.2	4.0	5.5

	PAH	120	150	180	200	250	320	400	450
EVAPORATOR COIL									
Qty					1				
Fins per meter					393				
No. of rows					4				
Total face area	m²	2.3	2.8	3.2	3.6	4.7	5.8	7.1	8.2
Tube diameter	mm				9.5				
SUPPLY FAN									
Type					DWDI, Forward Curved - Belt Drive				
Qty					1				
Fan model		Petra 560 F	Petra 630 F	Petra 630 F	Petra 710 F	Petra 800 F	Petra 900 F	Petra 1000 F	Petra 1000 F
Nominal air flow rate	L/s	5,663	7,078	8,494	9,438	11,797	15,101	18,876	21,235
Fan Motor									
Type					Induction - TEFC/ODP - IP55 Protection - Class F Insulation				
Qty					1				
Nominal rating	kW	7.5	11.0	11.0	11.0	15.0	18.5	22.0	30.0

Note

- Above air flow rate value are based at sea level where air density = 1.2 kg/m³

Physical Data - IMP

	PAH	12	16	24	32	40	50	62	80	100
EVAPORATOR COIL										
Qty						1				
Fins per inch						10				
No. of rows						4				
Total face area	ft²	2.5	3.0	4.9	6.7	8.3	10.0	12.5	16.5	20.1
Tube diameter	inch					3/8				
SUPPLY FAN										
Type						DWDI, Forward Curved - Belt Drive				
Qty						1				
Fan model		Petra 280 F	Petra 280 F	Petra 280 F	Petra 315 F	Petra 355 F	Petra 400 F	Petra 450 F	Petra 560 F	Petra 500 F
Nominal air flow rate	cfm	1,200	1,600	2,400	3,200	4,000	5,000	6,200	8,000	10,000
Fan Motor										
Type						Induction - TEFC/ODP - IP55 Protection - Class F Insulation				
Qty						1				
Nominal rating	HP	0.7	0.7	1.0	2.0	2.9	2.9	2.9	5.4	7.4

	PAH	120	150	180	200	250	320	400	450
EVAPORATOR COIL									
Qty						1			
Fins per inch						10			
No. of rows						4			
Total face area	ft²	24.4	30.2	34.5	38.3	50.0	62.3	76.7	88.9
Tube diameter	inch					3/8			
SUPPLY FAN									
Type						DWDI, Forward Curved - Belt Drive			
Qty						1			
Fan model		Petra 560 F	Petra 630 F	Petra 630 F	Petra 710 F	Petra 800 F	Petra 900 F	Petra 1000 F	Petra 1000 F
Nominal air flow rate	cfm	12,000	15,000	18,000	20,000	25,000	32,000	40,000	45,000
Fan Motor									
Type						Induction - TEFC/ODP - IP55 Protection - Class F Insulation			
Qty						1			
Nominal rating	HP	10.1	14.7	14.7	14.7	20.1	24.8	29.5	40.2

Note

- Above air flow rate value are based at sea level where air density = 0.075 lb/ft³

Performance Data - SI

	ON COIL		AFR (L/s)	4 ROWS				6 ROWS				8 ROWS			
	DBT (°C)	WBT (°C)		T. CAP (kW)	S. CAP (kW)	WFR (L/s)	WPD (kPa)	T. CAP (kW)	S. CAP (kW)	WFR (L/s)	WPD (kPa)	T. CAP (kW)	S. CAP (kW)	WFR (L/s)	WPD (kPa)
12	24	17	755	10	8	0	34.1	12	9	1	28.7	13	10	1	17.6
	26	18		12	8	1	47.5	14	10	1	38.9	16	11	1	23.6
	27	19		14	9	1	63.7	17	11	1	51.7	18	12	1	30.8
	29	21		17	10	1	95.7	21	12	1	75.3	22	13	1	44.3
16	24	17	566	13	10	1	39.8	16	12	1	27.8	18	13	1	20.9
	26	18		15	11	1	56.8	18	13	1	38.0	21	14	1	28.1
	27	19		18	11	1	74.8	22	14	1	50.8	24	15	1	36.8
	29	21		22	13	1	112.4	26	16	1	74.8	29	18	1	52.9
24	24	17	1,133	19	15	1	30.5	24	18	1	25.4	28	21	1	41.9
	26	18		23	16	1	42.5	28	19	1	35.0	33	22	1	56.5
	27	19		27	17	1	57.4	33	21	1	46.0	38	24	2	73.0
	29	21		34	20	1	86.4	40	24	2	67.9	46	28	2	103.5
32	24	17	1,510	27	20	1	39.5	33	25	1	26.9	37	27	2	20.0
	26	18		32	22	1	54.7	38	26	2	36.8	43	29	2	26.9
	27	19		38	23	2	73.6	45	28	2	48.7	50	31	2	34.7
	29	21		46	28	2	109.1	55	33	2	70.9	60	36	3	49.9
40	24	17	1,888	33	25	1	39.2	41	31	2	28.7	46	34	2	20.0
	26	18		40	28	2	54.7	48	33	2	39.2	54	36	2	26.6
	27	19		47	29	2	73.6	56	35	2	51.7	62	39	3	34.7
	29	21		58	35	3	109.7	68	41	3	75.0	75	45	3	49.9
50	24	17	2,360	41	31	2	41.6	50	38	2	28.4	57	42	2	21.2
	26	18		49	34	2	58.0	59	41	3	38.9	67	45	3	28.4
	27	19		58	36	3	78.0	69	44	3	50.8	77	48	3	37.1
	29	21		72	43	3	116.6	84	51	4	75.0	93	56	4	52.9
62	24	17	2,926	52	39	2	44.0	62	47	3	27.5	71	52	3	20.9
	26	18		62	42	3	61.0	74	51	3	37.7	83	56	4	28.1
	27	19		72	45	3	81.9	86	55	4	49.9	95	60	4	36.5
	29	21		89	53	4	122.3	105	64	5	72.7	116	70	5	52.3
80	24	17	3,775	65	50	3	28.4	81	61	3	27.2	90	67	4	15.0
	26	18		78	57	3	39.8	96	66	4	37.1	106	72	5	19.4
	27	19		92	58	4	53.8	111	71	5	48.7	122	77	5	25.4
	29	21		114	68	5	80.7	137	83	6	71.5	148	90	6	36.8
100	24	17	4,719	75	61	3	22.4	98	75	4	17.3	116	85	5	28.4
	26	18		93	66	4	33.2	116	81	5	23.9	135	91	6	38.0
	27	19		110	71	5	45.7	47	87	6	32.0	156	98	7	49.3
	29	21		136	84	6	69.1	166	101	7	46.9	189	114	8	70.6
120	24	17	5,663	90	73	4	21.8	118	90	5	16.7	139	102	6	27.5
	26	18		111	80	5	32.6	140	97	6	23.0	163	110	7	36.8
	27	19		132	86	6	44.9	163	104	7	30.8	187	118	8	47.5
	29	21		164	101	7	67.9	200	122	9	45.4	227	137	10	68.2

	ON COIL		AFR (L/s)	4 ROWS				6 ROWS				8 ROWS			
	DBT (°C)	WBT (°C)		T. CAP (kW)	S. CAP (kW)	WFR (L/s)	WPD (kPa)	T. CAP (kW)	S. CAP (kW)	WFR (L/s)	WPD (kPa)	T. CAP (kW)	S. CAP (kW)	WFR (L/s)	WPD (kPa)
150	24	17	7,079	112	92	5	22.4	147	113	6	17.0	174	128	7	28.1
	26	18		139	100	6	33.2	174	121	8	23.6	203	137	9	37.4
	27	19		165	107	7	45.7	203	130	9	31.4	234	147	10	48.7
	29	21		205	125	9	69.1	249	152	11	46.3	283	171	12	69.7
180	24	17	8,495	135	110	6	23.3	174	134	8	18.5	206	152	9	30.5
	26	18		162	118	7	32.9	207	144	9	25.7	241	164	10	40.7
	27	19		193	126	8	45.4	241	154	10	34.4	278	175	12	53.2
	29	21		244	150	10	70.9	297	181	13	50.5	337	204	15	76.2
200	24	17	9,438	150	122	6	23.3	192	148	8	19.1	218	164	9	15.0
	26	18		180	131	8	33.2	228	159	10	26.6	259	173	11	18.2
	27	19		214	141	9	45.7	266	171	11	35.6	300	185	13	23.9
	29	21		271	166	12	71.2	328	200	14	52.6	352	211	15	32.0
250	24	17	11,798	204	159	9	47.5	242	184	10	15.2	289	207	12	25.4
	26	18		244	171	11	66.4	288	198	12	21.2	338	223	15	33.8
	27	19		289	184	12	90.9	337	212	14	28.4	390	238	17	44.3
	29	21		355	215	15	134.3	415	249	18	42.2	440	263	19	55.3
320	24	17	15,101	281	208	12	42.8	324	241	14	33.2	379	269	16	53.2
	26	18		333	224	14	58.6	385	259	17	45.7	443	289	19	71.2
	27	19		387	239	17	77.7	447	278	19	60.4	506	308	22	91.2
	29	21		476	280	20	114.8	546	324	24	88.2	563	337	24	110.9
400	24	17	18,877	341	255	15	29.9	414	305	18	49.9	481	340	21	79.5
	26	18		405	274	17	41.3	491	329	21	68.2	560	364	24	104.9
	27	19		472	294	20	55.3	568	351	24	89.7	641	388	28	135.1
	29	21		583	344	25	82.2	693	409	30	129.8	703	421	30	160.3
450	24	17	21,235	398	294	17	43.1	482	355	21	38.9	576	417	25	42.5
	26	18		471	316	20	59.2	565	381	24	50.8	667	446	29	55.3
	27	19		548	339	24	78.6	651	407	28	73.6	761	475	33	70.6
	29	21		673	395	29	115.7	792	474	34	29.0	911	549	39	98.1

Legend

DBT : Dry Bulb Temperature
WBT : Wet Bulb Temperature
AFR : Air Flow Rate
T. CAP : Total Capacity
S.CAP : Sensible Capacity
WFR : Water Flow Rate
WPD : Water Pressure Drop

Note

- All data are based on 7OC entering water temperature & 5.5OC water temperature difference

Performance Data - IMP

	ON COIL		AFR (CFM)	4 ROWS				6 ROWS				8 ROWS			
	DBT (°F)	WBT (°F)		T. CAP (MBH)	S. CAP (MBH)	WFR (GPM)	WPD (ft H_2O)	T. CAP (MBH)	S. CAP (MBH)	WFR (GPM)	WPD (ft H_2O)	T. CAP (MBH)	S. CAP (MBH)	WFR (GPM)	WPD (ft H_2O)
12	76	63	1,200	34	26	7	11.4	41	31	8	9.6	46	34	9	5.9
	78	65		40	28	8	15.9	49	34	10	13.0	54	37	11	7.9
	80	67		47	30	9	21.3	57	36	11	17.3	63	40	13	10.3
	85	70		58	35	12	32.0	70	42	14	25.2	76	46	15	14.8
16	76	63	1,600	44	34	9	13.3	53	41	11	9.3	60	45	12	7.0
	78	65		52	36	11	19.0	63	44	13	12.7	71	49	14	9.4
	80	67		61	39	12	25.0	74	47	15	17.0	82	52	16	12.3
	85	70		76	46	15	37.6	90	55	18	25.0	100	61	20	17.7
24	76	63	2,400	66	51	13	10.2	81	61	16	8.5	96	70	19	14.0
	78	65		79	55	16	14.2	96	66	19	11.7	112	75	22	18.9
	80	67		93	59	19	19.2	112	70	22	15.4	129	81	26	24.4
	85	70		116	69	23	28.9	138	82	28	22.7	156	94	31	34.6
32	76	63	3,200	91	69	18	13.2	111	84	22	9.0	125	92	25	6.7
	78	65		109	75	22	18.3	131	90	26	12.3	146	99	29	9.0
	80	67		128	80	26	24.6	152	97	30	16.3	169	106	34	11.6
	85	70		158	94	32	36.5	186	113	37	23.7	205	124	41	16.7
40	76	63	4,000	114	87	23	13.1	139	105	28	9.6	156	116	31	6.7
	78	65		136	94	27	18.3	164	113	33	13.1	183	124	37	8.9
	80	67		160	100	32	24.6	191	121	38	17.3	211	133	42	11.6
	85	70		198	118	40	36.7	233	141	47	25.1	256	155	51	16.7
50	76	63	5,000	141	107	28	13.9	171	130	34	9.5	194	144	39	7.1
	78	65		168	116	34	19.4	203	140	41	13.0	227	154	45	9.5
	80	67		198	124	40	26.1	236	150	47	17.0	262	165	52	12.4
	85	70		245	146	49	39.0	288	175	58	25.1	318	192	64	17.7
62	76	63	6,200	176	134	35	14.7	213	161	43	9.2	241	178	48	7.0
	78	65		210	144	42	20.4	251	173	50	12.6	282	192	56	9.4
	80	67		246	155	49	27.4	292	186	58	16.7	325	205	65	12.2
	85	70		305	182	61	40.9	358	217	72	24.3	395	239	79	17.5
80	76	63	8,000	222	171	44	9.5	277	209	55	9.1	306	228	61	5.0
	78	65		266	195	53	13.3	327	225	65	12.4	360	246	72	6.5
	80	67		313	198	63	18.0	380	241	76	16.3	416	263	83	8.5
	85	70		389	233	78	27.0	466	282	93	23.9	506	307	101	12.3
100	76	63	10,000	256	208	51	7.5	334	256	67	5.8	395	291	79	9.5
	78	65		316	227	63	11.1	397	276	79	8.0	462	312	92	12.7
	80	67		375	244	75	15.3	162	296	92	10.7	532	334	106	16.5
	85	70		466	285	93	23.1	568	346	114	15.7	644	389	129	23.6
120	76	63	12,000	307	250	61	7.3	401	308	80	5.6	475	349	95	9.2
	78	65		379	272	76	10.9	477	331	95	7.7	555	375	111	12.3
	80	67		450	292	90	15.0	555	355	111	10.3	638	401	128	15.9
	85	70		561	344	112	22.7	682	416	136	15.2	773	467	155	22.8

	ON COIL		AFR (CFM)	4 ROWS				6 ROWS				8 ROWS			
	DBT (°F)	WBT (°F)		T. CAP (MBH)	S. CAP (MBH)	WFR (GPM)	WPD (ft H_2O)	T. CAP (MBH)	S. CAP (MBH)	WFR (GPM)	WPD (ft H_2O)	T. CAP (MBH)	S. CAP (MBH)	WFR (GPM)	WPD (ft H_2O)
150	76	63	15,000	383	312	77	7.5	500	384	100	5.7	592	436	118	9.4
	78	65		474	340	95	11.1	594	414	119	7.9	692	468	138	12.5
	80	67		563	365	113	15.3	693	443	139	10.5	797	501	159	16.3
	85	70		698	428	140	23.1	851	519	170	15.5	965	582	193	23.3
180	76	63	18,000	460	375	92	7.8	593	456	119	6.2	703	519	141	10.2
	78	65		554	402	111	11.0	705	492	141	8.6	822	558	164	13.6
	80	67		658	432	132	15.2	822	527	164	11.5	948	597	190	17.8
	85	70		832	511	166	23.7	1,012	617	202	16.9	1,150	695	230	25.5
200	76	63	20,000	511	416	102	7.8	655	504	131	6.4	744	561	149	5.0
	78	65		615	446	123	11.1	779	543	156	8.9	885	591	177	6.1
	80	67		731	479	146	15.3	909	583	182	11.9	1,024	633	205	8.0
	85	70		924	568	185	23.8	1,119	683	224	17.6	1,200	718	240	10.7
250	76	63	25,000	696	543	139	15.9	827	627	165	5.1	986	707	197	8.5
	78	65		833	584	167	22.2	983	675	197	7.1	1,154	759	231	11.3
	80	67		984	627	197	30.4	1,148	723	230	9.5	1,332	813	266	14.8
	85	70		1,212	732	243	44.9	1,417	848	283	14.1	1,500	898	300	18.5
320	76	63	32,000	960	709	192	14.3	1,107	822	221	11.1	1,292	917	258	17.8
	78	65		1,136	763	227	19.6	1,312	885	263	15.3	1,511	987	302	23.8
	80	67		1,322	817	264	26.0	1,525	948	305	20.2	1,728	1,050	346	30.5
	85	70		1,624	954	325	38.4	1,864	1,106	373	29.5	1,920	1,149	384	37.1
400	76	63	40,000	1,164	869	233	10.0	1,414	1,039	283	16.7	1,643	1,159	329	26.6
	78	65		1,382	936	276	13.8	1,675	1,121	335	22.8	1,910	1,242	382	35.1
	80	67		1,611	1,003	322	18.5	1,938	1,198	388	30.0	2,189	1,326	438	45.2
	85	70		1,988	1,174	398	27.5	2,363	1,396	473	43.4	2,400	1,437	480	53.6
450	76	63	45,000	1,360	1,002	272	14.4	1,644	1,212	329	13.0	1,966	1,422	393	14.2
	78	65		1,607	1,078	321	19.8	1,926	1,301	385	17.0	2,275	1,521	455	18.5
	80	67		1,870	1,155	374	26.3	2,222	1,390	445	24.6	2,597	1,622	519	23.6
	85	70		2,296	1,348	459	38.7	2,701	1,619	540	9.7	3,108	1,874	622	32.8

Legend

DBT : Dry Bulb Temperature
WBT : Wet Bulb Temperature
AFR : Air Flow Rate
T. CAP : Total Capacity
S.CAP : Sensible Capacity
WFR : Water Flow Rate
WPD : Water Pressure Drop

Note

- All data are based on 45OF entering water temperature & 10OF water temperature difference

Performance Data - Heating

- **2- ROWS**

Model (PAH)	AFR		T.CAP		WFR		WPD	
	(L/s)	(CFM)	(kW)	(MBH)	(L/s)	(GPM)	(kPa)	(ft H_2O)
12	566	1,200	18	62	0.3	4.1	63.1	21.1
16	755	1,600	23	79	0.3	5.2	40.7	13.6
24	1,133	2,400	36	122	0.5	8.2	57.7	19.3
32	1,510	3,200	48	163	0.7	10.9	41.3	13.8
40	1,888	4,000	59	203	0.9	13.5	34.7	11.6
50	2,360	5,000	74	252	1.1	16.8	43.4	14.5
62	2,926	6,200	92	314	1.3	21.0	45.4	15.2
80	3,775	8,000	118	402	1.7	26.8	15.3	5.1
100	4,719	10,000	150	514	2.2	34.2	29.7	9.9
120	5,663	12,000	181	619	2.6	41.2	29.3	9.8
150	7,079	15,000	226	770	3.2	51.4	29.7	9.9
180	8,495	18,000	269	918	3.9	61.2	30.5	10.2
200	9,438	20,000	285	972	4.1	64.8	30.8	10.3
250	11,798	25,000	356	1,214	5.1	81.0	20.3	6.8
320	15,101	32,000	471	1,608	6.8	107.2	19.3	6.5
400	18,877	40,000	602	2,054	8.6	136.9	28.8	9.6
450	21,235	45,000	662	2,258	9.5	150.5	40.7	13.6

Legend

AFR : Air Flow Rate
T. CAP : Total Capacity
WFR : Water Flow Rate
WPD : Water Pressure Drop

Note

- All data are based on 21OC (70OF) air on coil temperature
- All data are based on 82/66OC (180/150OF) entering/ leaving water temperature

• 4- ROWS

Model (PAH)	AFR		T.CAP		WFR		WPD	
	(L/s)	(CFM)	(kW)	(MBH)	(L/s)	(GPM)	(kPa)	(ft H_2O)
12	566	1,200	26	88	0.4	5.9	20.9	7.0
16	755	1,600	34	116	0.5	7.7	24.8	8.3
24	1,133	2,400	51	174	0.7	11.6	18.8	6.3
32	1,510	3,200	74	254	1.1	16.9	26.9	9.0
40	1,888	4,000	93	317	1.3	21.1	26.9	9.0
50	2,360	5,000	115	392	1.7	26.2	28.5	9.5
62	2,926	6,200	143	488	2.1	32.5	28.2	9.4
80	3,775	8,000	190	649	2.7	43.2	57.9	19.4
100	4,719	10,000	230	784	3.3	52.2	18.3	6.1
120	5,663	12,000	276	943	4.0	62.9	18.0	6.0
150	7,079	15,000	344	1,175	4.9	78.4	18.3	6.1
180	8,495	18,000	411	1,403	5.9	93.5	18.9	6.3
200	9,438	20,000	420	1,432	6.0	95.5	17.9	6.0
250	11,798	25,000	540	1,843	7.8	122.9	32.6	10.9
320	15,101	32,000	682	2,327	9.8	155.1	21.5	7.2
400	18,877	40,000	919	3,134	13.2	209.0	17.5	5.9
450	21,235	45,000	959	3,272	13.8	218.1	22.4	7.5

Legend

AFR : Air Flow Rate
T. CAP : Total Capacity
WFR : Water Flow Rate
WPD : Water Pressure Drop

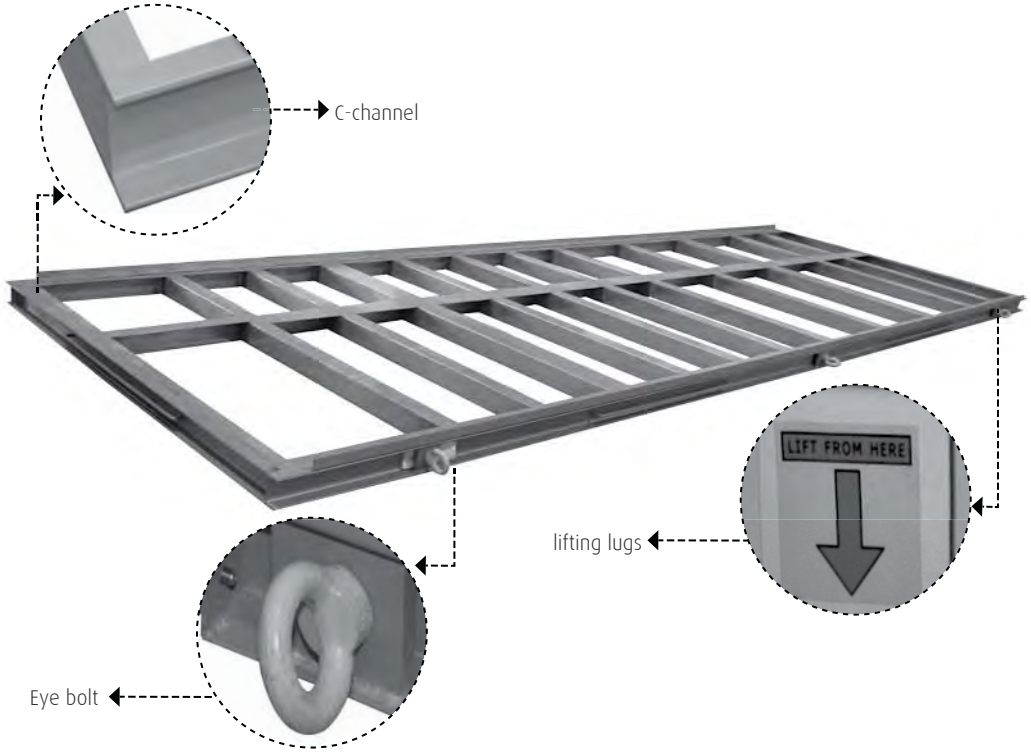
Note

- All data are based on 21OC (70OF) air on coil temperature
- All data are based on 82/66OC (180/150OF) entering/ leaving water temperature

Sections and Features

Construction / Base

- Structural welded galvanized steel C-channel base with full supporting cross members, equipped with screwed-in lifting lugs (eye bolts) of suitable loading capacity which are fitted on a welded bracket to the side of the C- channel
- 3 mm (0.12″) thick for models PAH12 ~ PAH200 and 6 mm (0.24″) thick for PAH250 ~ PAH450
- The base members are coated with primer sprayed paint
- Base height is 100 mm (4″). 140 mm (5.5″) and 180 mm (7″) are available as optional features
- Painted base is available as optional feature

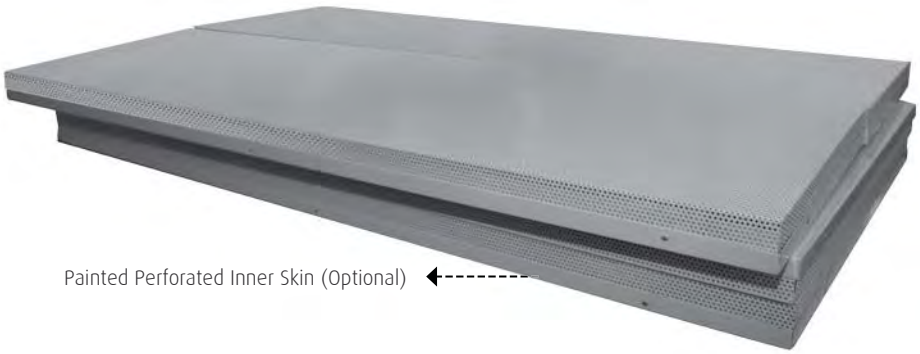


Construction / Frame

- Unit frame is constructed of high quality grade extruded metal profiles. Unit's rigidity and flexibility are achieved by using Penta-post construction, which consists of strong metallic corners joined together by male and female fixtures
- Internal cavity for this frame is filled with 3Ib/ft^3 density injected foam insulation

Construction / Panels

- Double Wall G-90 galvanized steel
- 50mm (2") injected foam, 3 pcf insulation density as minimum
- No Metal Through panels along full panel parameter
- 16-22 gauge painted interior and exterior panels
- Standard panels are galvanized steel, stainless steel and aluminum panels are optional
- Each panel shall have a machine applied foam gasket that seals all around its edges
- Petra paint is certified according to ASTM 117 A&B 5,000 hours salt spray test
- Painted perforated inner skin is available as optional feature



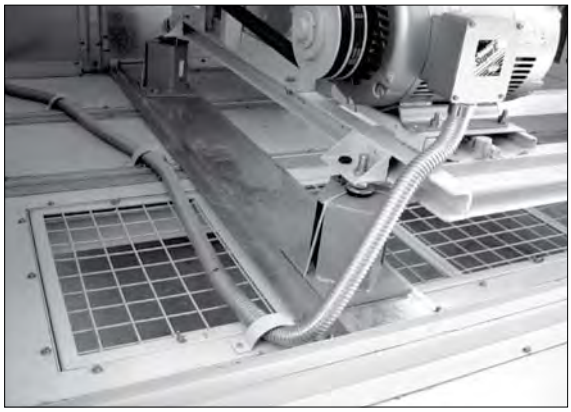
Sections and Features

Construction / Floors

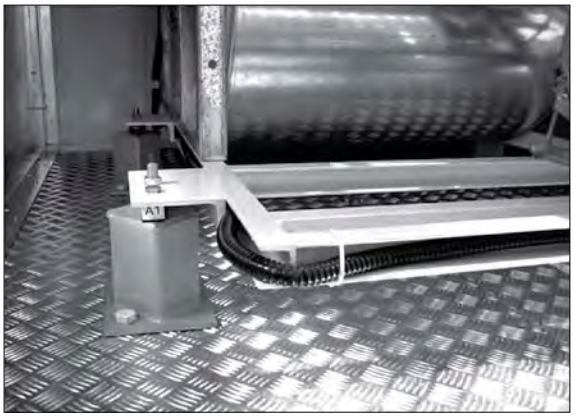
- Double skin G-90 galvanized steel
- 50mm (2") injected foam, 3 pcf insulation density as minimum
- No Metal Through panels along full panel parameter
- Petra paint is certified according to ASTM 117 A&B 5,000 hours salt spray test

Galvanized Steel Floor

Painted Steel Floor (Optional)



Aluminum Tread Plate Floor (Optional)

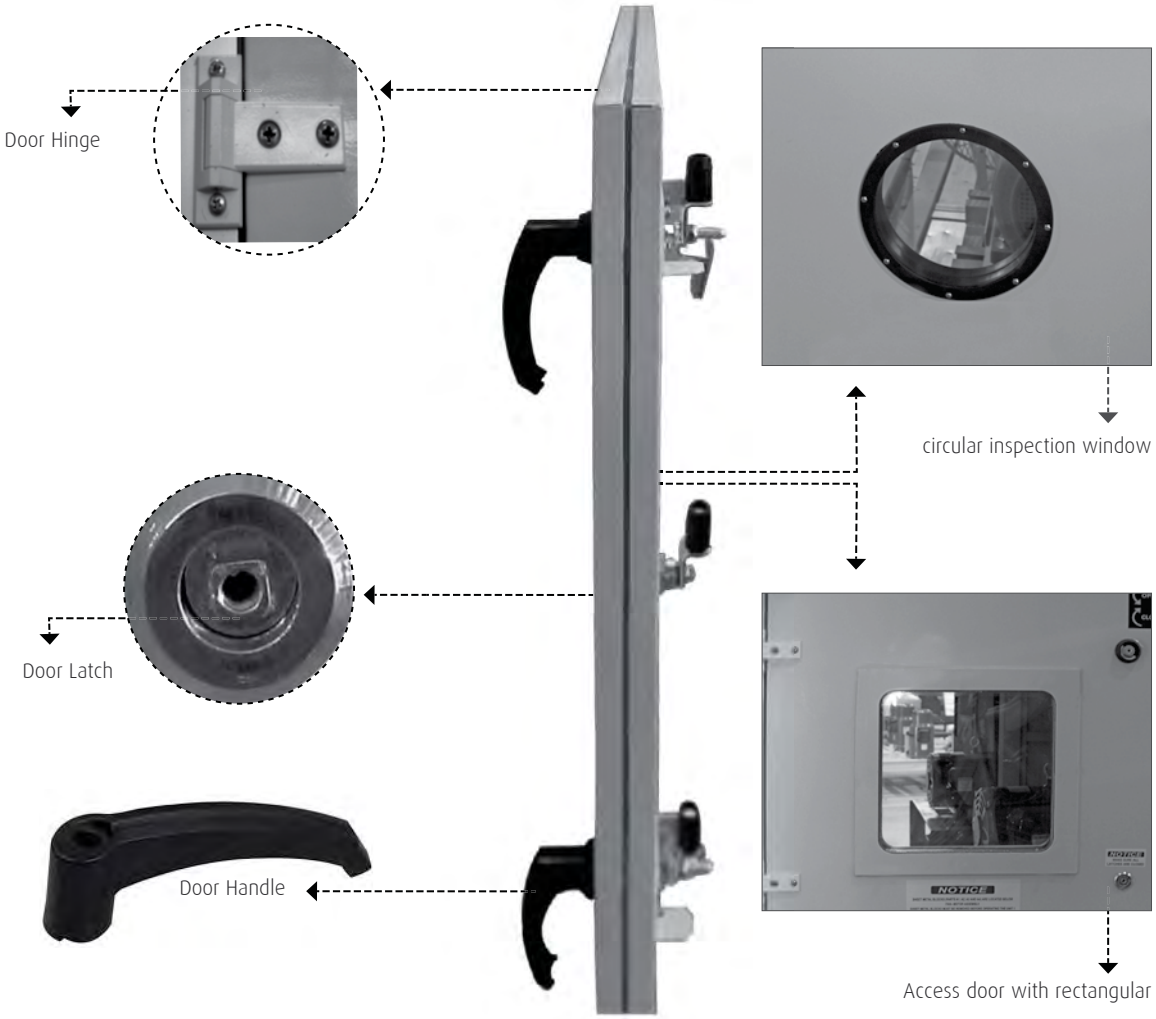


Construction / Doors

- Double Wall G-90 galvanized steel
- 38 mm (1.5") injected foam, 3 pcf insulation density as minimum
- No Metal Through doors along full door parameter
- 16-22 gauge painted interior and exterior panels
- Standard panels are galvanized steel, stainless steel and aluminum panels are optional
- Clip on PVC gasket
- Minimum two PVC AB Ind handles openable from inside & outside
- Petra paint is certified according to ASTM 117 A&B 5,000 hours salt spray test

Optional features for access doors:

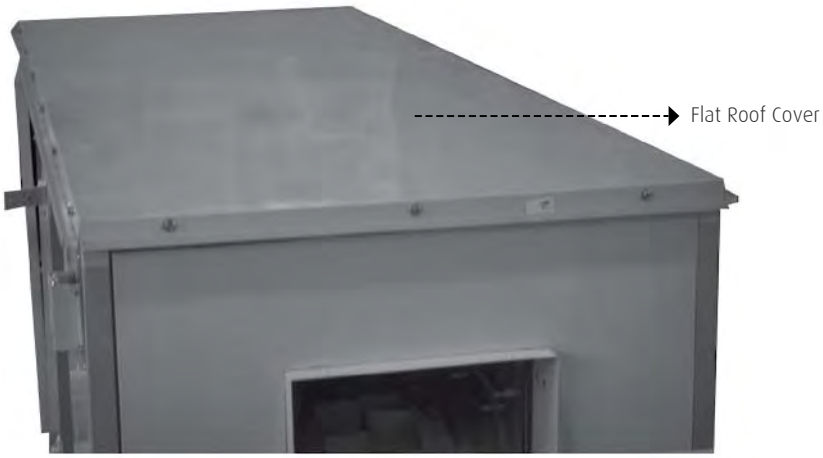
- Inspection window (rectangular/circular)
- Access doors that can be opened from inside & outside the unit
- One tooled latched handle
- Heavy duty neoprene type door gasket
- Door open against pressure (inswing door)
- Relief latch for pressure opened doors
- Stainless steel piano hinges



Sections and Features

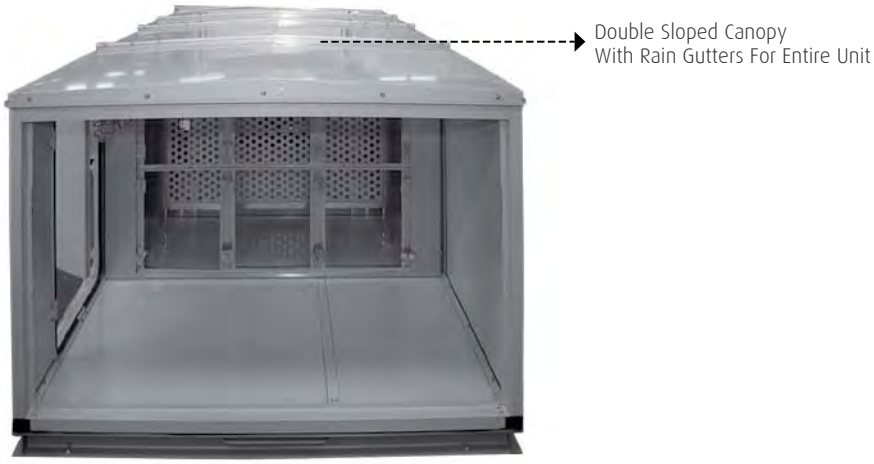
Construction / Roof Cover

- Outdoor installed units are air and water tight and provided with flat roof covers with standing top seams
- The unit roof cover extended to make rain gutters along the unit perimeter to ensure positive rainwater drainage
- Gauge 20 [0.9 mm (0.04 inch)] galvanized steel outer skin painted with electrostatic polyester powder coat, oven baked
- Petra paint is certified according to ASTM 117 A&B 5,000 hours salt spray test



Construction / Roof Canopy (Optional)

- Double sloped roof canopy with standing top seams as standard
- Rain Gutters are provided along the full canopy perimeter to ensure positive rainwater drainage
- All roof canopy components are fully caulked & sealed to prevent any water leakage
- Roof canopy is coated with weather-proof, polyester powder electrostatic paint, oven-baked
- Additional rain gutters are provided for access doors/panels (if not covered by rain gutters)
- Petra paint is certified according to ASTM 117 A&B 5,000 hours salt spray test



Air Mixing / Dampers

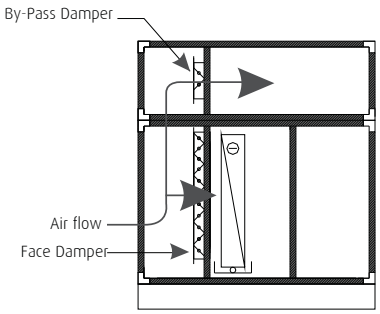
All dampers are made with rigid anodized aluminum frame with multi airfoil aluminum blades so as to reduce pressure drop and sound generated when air passes through the blades. An opposed blades arrangement is used with virtually no air leakage. Damper blade's rotation is achieved by the PVC gear's rotation

Options:

- Jam seals: flexible metal compression type along control damper sides
- Blade seals: seal along control damper blade edges
- Upon request the dampers are supplied with a manually adjustable
- Lever that can be located on either side of the damper
- Damper could be linked for motorized operation

Face and By-Pass Damper

This type of damper is designed to pass an air stream around a coil in order to control the air stream conditions. Up to 100% air by-pass can be achieved if required



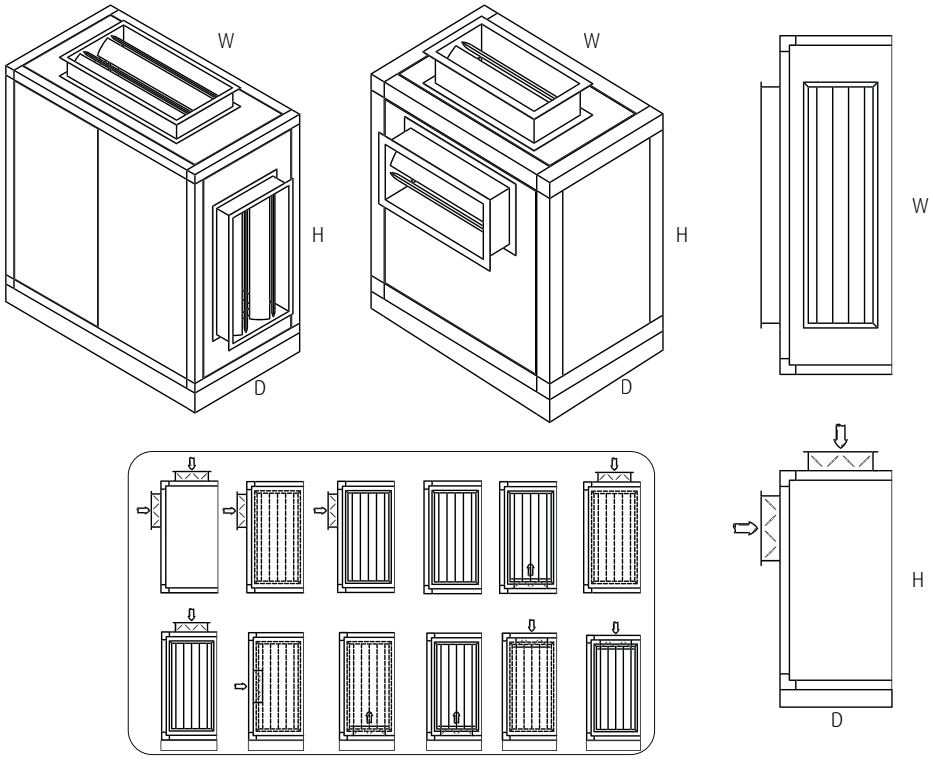
Model (PAH)			12		16		24		32		40		50		62		80	
W	mm	(inch)	850	(33.5)	850	(33.5)	1010	(39.8)	1420	(55.9)	1420	(55.9)	1420	(55.9)	1420	(55.9)	1760	(69.3)
H	mm	(inch)	800	(31.5)	800	(31.5)	960	(37.8)	960	(37.8)	960	(37.8)	1370	(53.9)	1370	(53.9)	1370	(53.9)
D	mm	(inch)	500	(19.7)	500	(19.7)	500	(19.7)	500	(19.7)	500	(19.7)	500	(19.7)	500	(19.7)	500	(19.7)

Model (PAH)			100		120		150		180		200		250		320		400		450	
W	mm	(inch)	2170	(85.4)	2170	(85.4)	2170	(85.4)	2170	(85.4)	2170	(85.4)	2740	(107.9)	3490	(137.4)	4060	(159.8)	4560	(179.5)
H	mm	(inch)	1370	(53.9)	1550	(61.0)	1870	(73.6)	2120	(83.5)	2280	(89.8)	2280	(89.8)	2280	(89.8)	2280	(89.8)	2280	(89.8)
D	mm	(inch)	500	(19.7)	500	(19.7)	750	(29.5)	750	(29.5)	750	(29.5)	750	(29.5)	750	(29.5)	750	(29.5)	750	(29.5)

Sections and Features

Air Mixing / Mixing Box

- Mixing box module combines the incoming outdoor air with the circulated return air from the conditioned space
- Mixing box is supplied with fresh and return air dampers
- Exhaust box function is to exhaust some of the circulated air and return the rest to the supply air stream
- Both mixing or exhaust box dampers are low leakage opposed
- Aluminum blades type are used, and assembled in aluminum frame
- Dampers can be operated manually or motorized by an actuator
- A combination for mixing boxes with panel filters can be provided in one module
- Economizer section with exhaust box is available



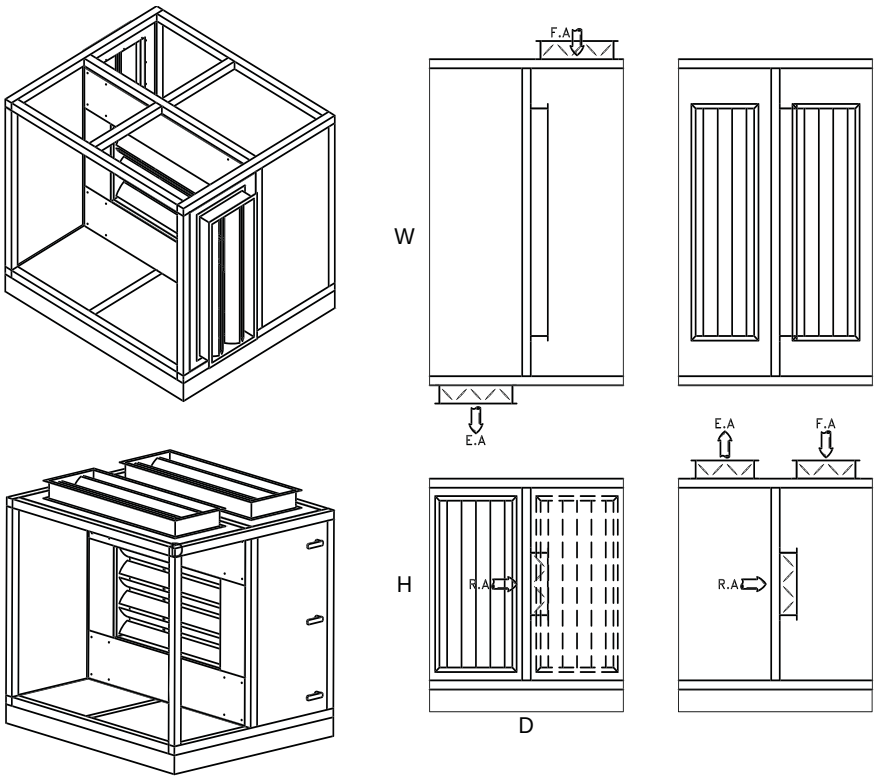
Model (PAH)			12		16		24		32		40		50		62		80	
W	mm	(inch)	850	(33.5)	850	(33.5)	1010	(39.8)	1420	(55.9)	1420	(55.9)	1420	(55.9)	1420	(55.9)	1760	(69.3)
H	mm	(inch)	800	(31.5)	800	(31.5)	960	(37.8)	960	(37.8)	960	(37.8)	1370	(53.9)	1370	(53.9)	1370	(53.9)
D	mm	(inch)	500	(19.7)	500	(19.7)	500	(19.7)	500	(19.7)	500	(19.7)	750	(29.5)	750	(29.5)	750	(29.5)

Model (PAH)			100		120		150		180		200		250		320		400		450	
W	mm	(inch)	2170	(85.4)	2170	(85.4)	2170	(85.4)	2170	(85.4)	2170	(85.4)	2740	(107.9)	3490	(137.4)	4060	(159.8)	4560	(179.5)
H	mm	(inch)	1370	(53.9)	1550	(61.0)	1870	(73.6)	2120	(83.5)	2280	(89.8)	2280	(89.8)	2280	(89.8)	2280	(89.8)	2280	(89.8)
D	mm	(inch)	750	(29.5)	750	(29.5)	750	(29.5)	750	(29.5)	750	(29.5)	750	(29.5)	750	(29.5)	750	(29.5)	750	(29.5)

Air Mixing / Economizer

In economizer operation the outside air and return air dampers operate to maintain the supply control set point. If economizer operation cannot provide enough cooling to satisfy the supply air control set point, mechanical cooling will be energized. Once mechanical cooling is operating, the outside air damper position is either set at 100% open or at the minimum position set point

According to the application, the economizer could contain an exhaust damper function to exhaust some of the circulated air. All economizer dampers are low leakage opposed, aluminum blades type, and they are assembled in an aluminum frame. These dampers can be operated manually or by an actuator (Optional). A combination for mixing boxes (OA & RA dampers) with panel filters can be provided in one module. Economizer also includes hoods for OA and EA damper opening or louvers for EA openings



Model (PAH)			12		16		24		32		40		50		62		80	
W	mm	(inch)	850	(33.5)	850	(33.5)	1010	(39.8)	1420	(55.9)	1420	(55.9)	1420	(55.9)	1420	(55.9)	1760	(69.3)
H	mm	(inch)	800	(31.5)	800	(31.5)	960	(37.8)	960	(37.8)	960	(37.8)	1370	(53.9)	1370	(53.9)	1370	(53.9)
D-Indoor	mm	(inch)	960	(37.8)	960	(37.8)	960	(37.8)	960	(37.8)	960	(37.8)	1450	(57.1)	1450	(57.1)	1450	(57.1)
D-Outdoor	mm	(inch)	950	(37.4)	950	(37.4)	950	(37.4)	950	(37.4)	1200	(47.2)	1200	(47.2)	1200	(47.2)	1450	(57.1)

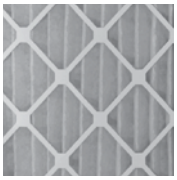
Model (PAH)			100		120		150		180		200		250		320		400		450	
W	mm	(inch)	2170	(85.4)	2170	(85.4)	2170	(85.4)	2170	(85.4)	2170	(85.4)	2740	(107.9)	3490	(137.4)	4060	(159.8)	4560	(179.5)
H	mm	(inch)	1370	(53.9)	1550	(61.0)	1870	(73.6)	2120	(83.5)	2280	(89.8)	2280	(89.8)	2280	(89.8)	2280	(89.8)	2280	(89.8)
D-Indoor	mm	(inch)	1450	(57.1)	1450	(57.1)	1870	(73.6)	1870	(73.6)	1870	(73.6)	1870	(73.6)	2150	(84.6)	2150	(84.6)	2150	(84.6)
D-Outdoor	mm	(inch)	1450	(57.1)	1660	(65.4)	1660	(65.4)	1660	(65.4)	1910	(75.2)	1910	(75.2)	1910	(75.2)	1910	(75.2)	1910	(75.2)

Sections and Features

Filters / Flat Filter (Internal)

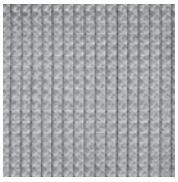
1- Pleated

- Environment-friendly materials
- High tensile strength media
- Rigid construction
- Max. Temperature up to 90°C [194°F]



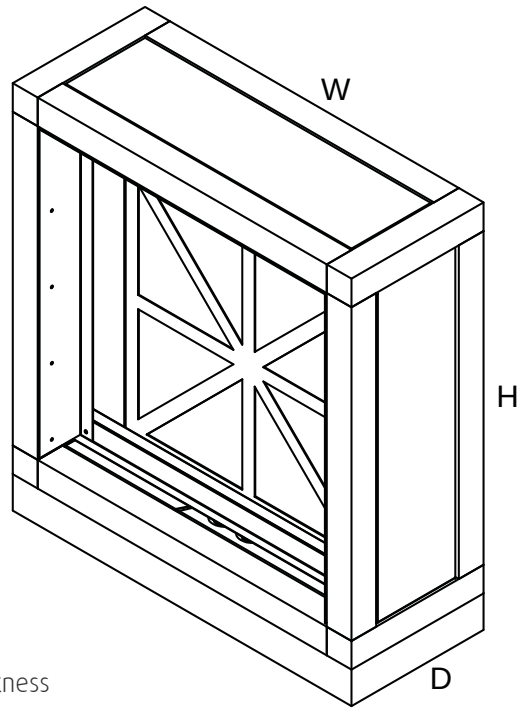
2- Synthetic

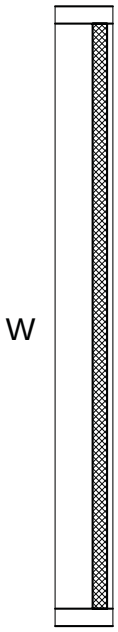
- A progressively structured filter media made from thermally bonded synthetic fibers
- Operation Temperature up to 130°C (266°F)

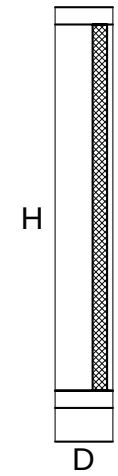


3- Aluminum

- Flexibility in shape
- Low resistance
- Washable







Filter Type	Aluminum	Synthetic	Pleated
MERV Rating	MERV 1 - 4	MERV 5	MERV 7 - 8
Euro. Effi. Class	G1,G2	G3	G4
Arrestance %	60 - 80 %	80 - 90 %	95 %
Efficiency %	< 20 %	< 20 %	30 - 40 %

- 50 mm (2 inch) and 100 mm (4 inch) thickness are available
- Magnehelic filter gauge, dirty filter switch & pressure taps are available as optional features for all filters

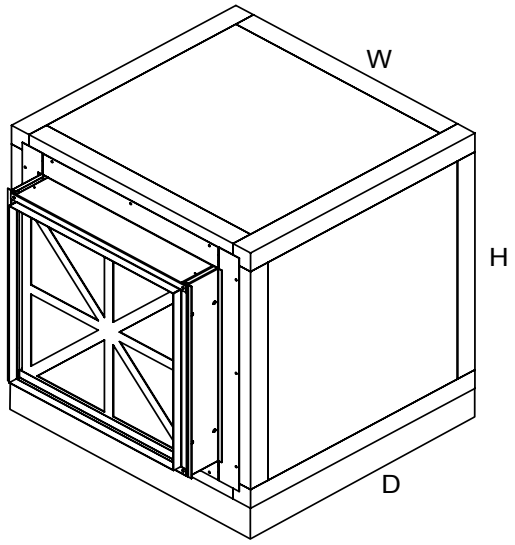
Model (PAH)			12		16		24		32		40		50		62		80	
W	mm	(inch)	850	(33.5)	850	(33.5)	1010	(39.8)	1420	(55.9)	1420	(55.9)	1420	(55.9)	1420	(55.9)	1760	(69.3)
H	mm	(inch)	800	(31.5)	800	(31.5)	960	(37.8)	960	(37.8)	960	(37.8)	1370	(53.9)	1370	(53.9)	1370	(53.9)
D	mm	(inch)	300	(11.8)	300	(11.8)	300	(11.8)	300	(11.8)	300	(11.8)	300	(11.8)	300	(11.8)	300	(11.8)

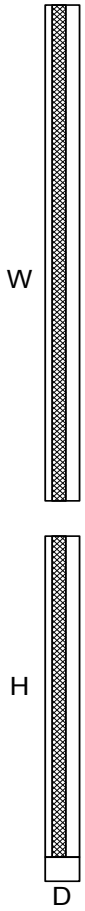
Model (PAH)			100		120		150		180		200		250		320		400		450	
W	mm	(inch)	2170	(85.4)	2170	(85.4)	2170	(85.4)	2170	(85.4)	2170	(85.4)	2740	(107.9)	3490	(137.4)	4060	(159.8)	4560	(179.5)
H	mm	(inch)	1370	(53.9)	1550	(61.0)	1870	(73.6)	2120	(83.5)	2280	(89.8)	2280	(89.8)	2280	(89.8)	2280	(89.8)	2280	(89.8)
D	mm	(inch)	300	(11.8)	300	(11.8)	300	(11.8)	300	(11.8)	300	(11.8)	300	(11.8)	300	(11.8)	300	(11.8)	300	(11.8)

Filters / Flat Filter (External)

- **Available for Pleated, Synthetic & Aluminum flat filter types**

Model (PAH)	Cell Dimensions		
	mm	inch	QTY
12	610x610	[24x24]	1
16	610x610	[24x24]	1
24 (Aluminum)	305x610	[12x24]	1
	508x610	[20x24]	1
24 (Pleated)	406x635	[16x25]	2
32	610x610	[24x24]	2
40	610x610	[24x24]	2
50	610x610	[24x24]	4
62	610x610	[24x24]	4
80	508x610	[20x24]	6
100	508x610	[20x24]	8
120	508x610	[20x24]	8
150	508x610	[20x24]	9
180	610x610	[24x24]	9
200	508x610	[20x24]	12
250	508x610	[20x24]	15
320	508x610	[20x24]	9
	610x610	[24x24]	9
400	508x610	[20x24]	24
450	508x610	[20x24]	27





Note

- External flat filter is applicable for PAH 12 to PAH 100. Internal flat filter is used for larger models

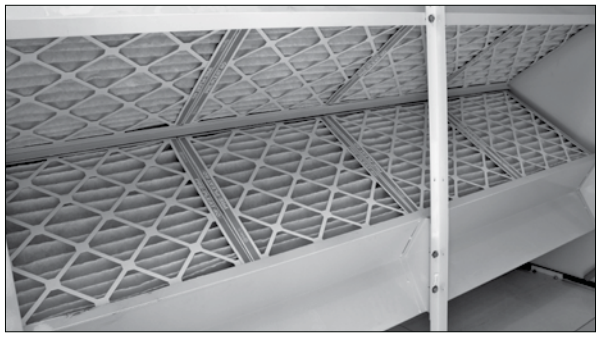
- 50 mm (2 inch) and 100 mm (4 inch) thickness are available
- Magnehelic filter gauge, dirty filter switch & pressure taps are available as optional features for all filters

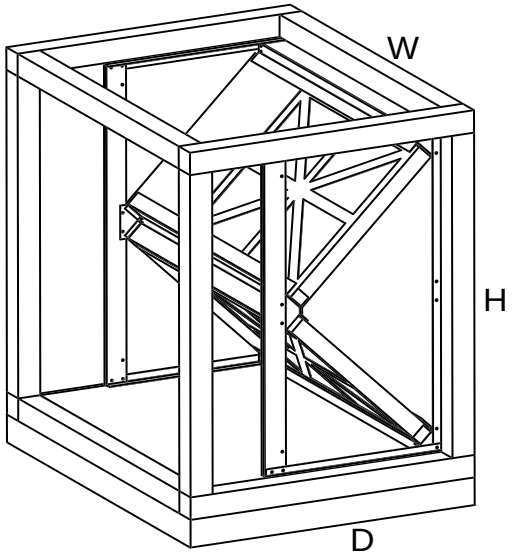
Model (PAH)			12		16		24		32		40		50		62		80		100	
W	mm	(inch)	850	(33.5)	850	(33.5)	1010	(39.8)	1420	(55.9)	1420	(55.9)	1420	(55.9)	1420	(55.9)	1760	(69.3)	2170	(85.4)
H	mm	(inch)	800	(31.5)	800	(31.5)	960	(37.8)	960	(37.8)	960	(37.8)	1370	(53.9)	1370	(53.9)	1370	(53.9)	1370	(53.9)
D	mm	(inch)	125	(4.9)	125	(4.9)	125	(4.9)	125	(4.9)	125	(4.9)	125	(4.9)	125	(4.9)	125	(4.9)	125	(4.9)

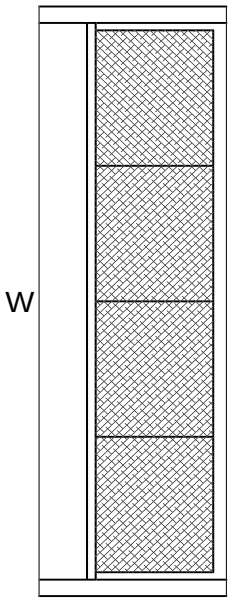
Sections and Features

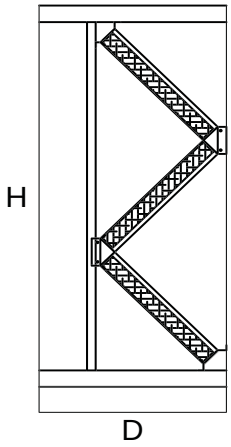
Filters / Flat Filter (Vee Filter)

- **Available for Pleated, Synthetic & Aluminum flat filter types**
- **Vee Filters are highly recommended whenever face velocity is to be reduced**









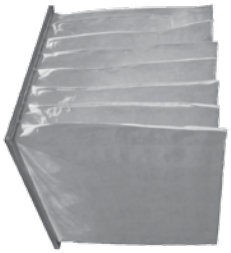
- 50 mm (2 inch) and 100 mm (4 inch) thickness are available
- Magnehelic filter gauge, dirty filter switch & pressure taps are available as optional features for all filters

Model (PAH)			12		16		24		32		40		50		62		80	
W	mm	(inch)	850	(33.5)	850	(33.5)	1010	(39.8)	1420	(55.9)	1420	(55.9)	1420	(55.9)	1420	(55.9)	1760	(69.3)
H	mm	(inch)	800	(31.5)	800	(31.5)	960	(37.8)	960	(37.8)	960	(37.8)	1370	(53.9)	1370	(53.9)	1370	(53.9)
D	mm	(inch)	750	(29.5)	750	(29.5)	750	(29.5)	750	(29.5)	750	(29.5)	750	(29.5)	750	(29.5)	750	(29.5)

Model (PAH)			100		120		150		180		200		250		320		400		450	
W	mm	(inch)	2170	(85.4)	2170	(85.4)	2170	(85.4)	2170	(85.4)	2170	(85.4)	2740	(107.9)	3490	(137.4)	4060	(159.8)	4560	(179.5)
H	mm	(inch)	1370	(53.9)	1550	(61.0)	1870	(73.6)	2120	(83.5)	2280	(89.8)	2280	(89.8)	2280	(89.8)	2280	(89.8)	2280	(89.8)
D	mm	(inch)	750	(29.5)	750	(29.5)	750	(29.5)	750	(29.5)	750	(29.5)	750	(29.5)	750	(29.5)	750	(29.5)	750	(29.5)

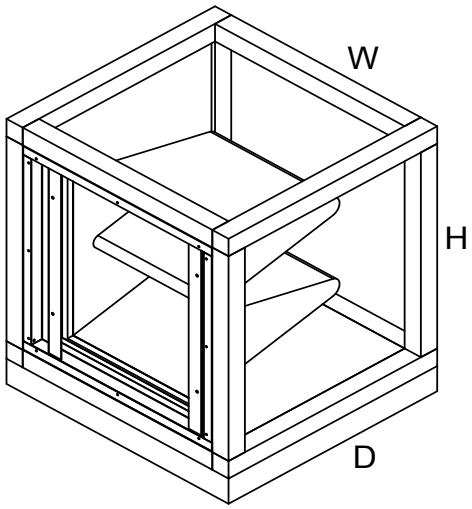
Filters / Bag Filter

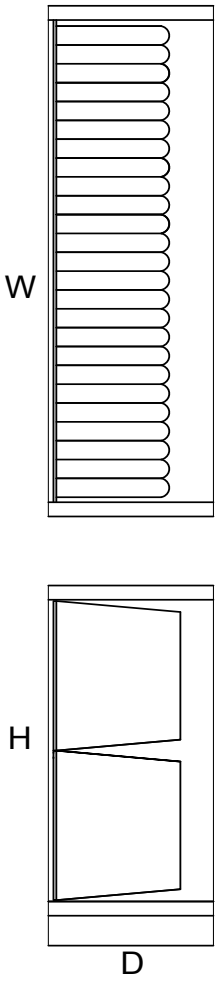
- Used when higher level of filtration than flat or V-types is required
- Made of synthetic media
- Mechanically strong with high absorption resistance
- Excellent performance in high moisture conditions
- Low initial pressure drop
- High dust holding capacity
- Long service life
- Max. operation temperature 60°C (140°F)



Model (PAH)	Cell Dimensions		
	mm	inch	QTY
12	508x610	[20x24]	1
16	508x610	[20x24]	1
24	305x610	[12x24]	1
	508x610	[20x24]	1
32	610x610	[24x24]	2
40	610x610	[24x24]	2
50	508x610	[20x24]	4
62	508x610	[20x24]	4
80	610x610	[24x24]	4
100	508x610	[20x24]	6
120	610x610	[24x24]	6
150	508x610	[20x24]	9
180	610x610	[24x24]	9
200	508x610	[20x24]	12
250	508x610	[20x24]	12
	305x610	[12x24]	3
320	508x610	[20x24]	12
	610x610	[24x24]	6
400	508x610	[20x24]	12
	610x610	[24x24]	9
450	610x610	[24x24]	21

MERV Rating	MERV 14 - 15
Euro. Effi. Class	F8
Arrestance %	99 %
Efficiency %	90 - 95 %





- 50 mm (2 inch) and 100 mm (4 inch) thickness are available
- Magnehelic filter gauge, dirty filter switch & pressure taps are available as optional features for all filters

Model (PAH)			12		16		24		32		40		50		62		80	
W	mm	(inch)	850	(33.5)	850	(33.5)	1010	(39.8)	1420	(55.9)	1420	(55.9)	1420	(55.9)	1420	(55.9)	1760	(69.3)
H	mm	(inch)	800	(31.5)	800	(31.5)	960	(37.8)	960	(37.8)	960	(37.8)	1370	(53.9)	1370	(53.9)	1370	(53.9)
D	mm	(inch)	750	(29.5)	750	(29.5)	750	(29.5)	750	(29.5)	750	(29.5)	750	(29.5)	750	(29.5)	750	(29.5)

Model (PAH)			100		120		150		180		200		250		320		400		450	
W	mm	(inch)	2170	(85.4)	2170	(85.4)	2170	(85.4)	2170	(85.4)	2170	(85.4)	2740	(107.9)	3490	(137.4)	4060	(159.8)	4560	(179.5)
H	mm	(inch)	1370	(53.9)	1550	(61.0)	1870	(73.6)	2120	(83.5)	2280	(89.8)	2280	(89.8)	2280	(89.8)	2280	(89.8)	2280	(89.8)
D	mm	(inch)	750	(29.5)	750	(29.5)	750	(29.5)	750	(29.5)	750	(29.5)	750	(29.5)	750	(29.5)	750	(29.5)	750	(29.5)

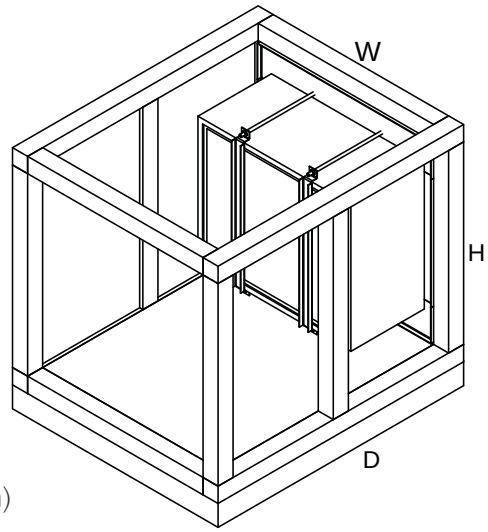
Sections and Features

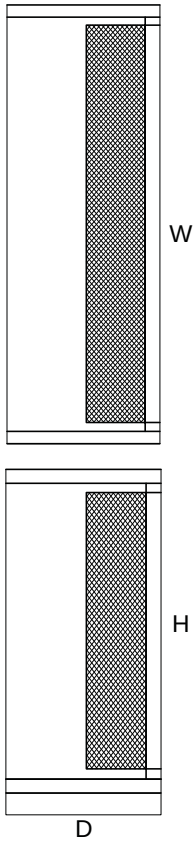
Filters / Hepa Filter

- Used in clean room applications to achieve very high efficiency of filtration
- Less costly installation space is necessary
- Energy Saving
- Long service life
- Max. operation temperature up to 90°C (194°F)

Model (PAH)	Cell Dimensions		
	mm	inch	QTY
12	508x610	[20x24]	1
16	508x610	[20x24]	1
24	762x610	[30x24]	1
32	508x610	[20x24]	2
40	610x610	[24x24]	2
50	762x610	[30x24]	2
62	610x610	[24x24]	4
80	610x610	[24x24]	4
100	508x610	[20x24]	6
120	610x610	[24x24]	6
150	762x610	[30x24]	6
180	762x610	[30x24]	6
200	762x610	[30x24]	6
	508x610	[20x24]	3
250	762x610	[30x24]	4
	610x610	[24x24]	8
320	762x610	[30x24]	5
	610x610	[24x24]	10
400	762x610	[30x24]	6
	610x610	[24x24]	12

Euro. Effi. Class	U13
Arrestance %	99.99 %





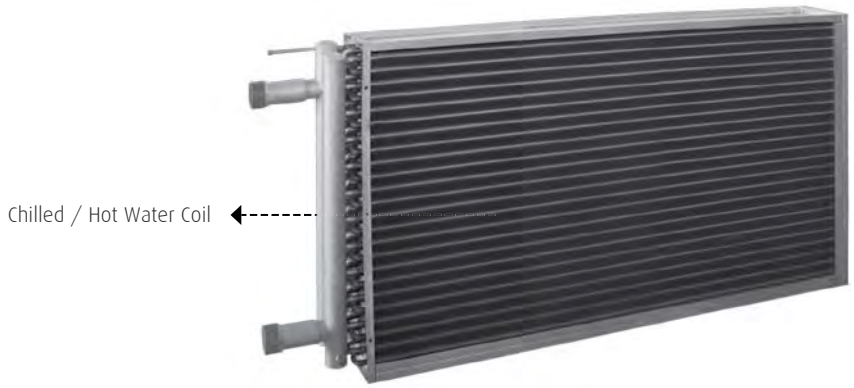
- 50 mm (2 inch) and 100 mm (4 inch) thickness are available
- Magnehelic filter gauge, dirty filter switch & pressure taps are available as optional features for all filters

Model (PAH)			12		16		24		32		40		50		62		80	
W	mm	(inch)	850	(33.5)	850	(33.5)	1010	(39.8)	1420	(55.9)	1420	(55.9)	1420	(55.9)	1420	(55.9)	1760	(69.3)
H	mm	(inch)	800	(31.5)	800	(31.5)	960	(37.8)	960	(37.8)	960	(37.8)	1370	(53.9)	1370	(53.9)	1370	(53.9)
D	mm	(inch)	960	(37.8)	960	(37.8)	960	(37.8)	960	(37.8)	960	(37.8)	960	(37.8)	960	(37.8)	960	(37.8)

Model (PAH)			100		120		150		180		200		250		320		400		450	
W	mm	(inch)	2170	(85.4)	2170	(85.4)	2170	(85.4)	2170	(85.4)	2170	(85.4)	2740	(107.9)	3490	(137.4)	4060	(159.8)	4560	(179.5)
H	mm	(inch)	1370	(53.9)	1550	(61.0)	1870	(73.6)	2120	(83.5)	2280	(89.8)	2280	(89.8)	2280	(89.8)	2280	(89.8)	2280	(89.8)
D	mm	(inch)	960	(37.8)	960	(37.8)	960	(37.8)	960	(37.8)	960	(37.8)	960	(37.8)	960	(37.8)	960	(37.8)	960	(37.8)

Coils / Chilled Water

- Petra's air handling coils are manufactured in-house in Petra coil manufacturing facility
- Coils are AHRI 410 certified & stamped
- Coils are designed to deliver their respective duties at optimum performance under all design conditions.
- Coils are tested at 3,100 kPa (450 Psi) air pressure under water
- They also undergo dry chemical cleaning after coil manufacturing for optimum system cleanliness
- Airtight gaskets are used where coil pipes exit the unit casing. The sealing around the coil prevents air by-pass
- As a standard in the water coils, a drainage is attached to the coil, and an air vent in the highest point of the coil to relief the air from the coil



- Tubes

- 9.5 mm (3/8") seamless copper
- 15.9 mm (5/8") as optional
- Mechanically expanded into full length fin collars
- Copper return bends stub connections are brazed into expanded tube ends using brazing alloy are available up to 12 rows

- Fins

- Aluminum alloy fins configured sinusoidal type fins
- 8 to 16 fins per inch available for 3/8''
- 6 to 14 fins per inch available for 5/8'' (optional)

- Headers

- Inlet and outlet headers are Type L made from heavy wall seamless copper tubing
- Header have die formed collars to provide a strong durable brazing joint

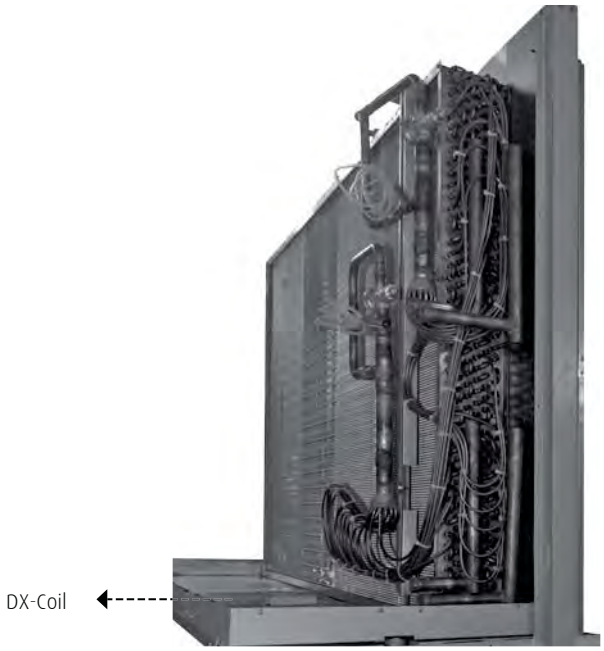
- Coil Casing (Coil end plate)

- 1.5 mm (0.06") mill galvanized sheet metal with full slotted flanges for convenient mounting
- Stainless steel coil casing (Optional)

Sections and Features

Coils / DX-Coils

- Direct expansion (DX) coils are designed to meet a wide range of temperatures, from air handler to sub-zero freezing applications
- Circuiting is matched to compressor requirements, and coil face can be split to meet your specific need
- Coils are AHRI 410 certified & stamped
- Coils are designed to deliver their respective duties at optimum performance under all design conditions
- Coils are tested at 6,200 kPa (900 Psi) air pressure under water
- They also undergo dry chemical cleaning after coil manufacturing for optimum system cleanliness
- Airtight gaskets are used where coil pipes exit the unit casing. The sealing around the coil prevents air by-pass



- Tubes

- 9.5 mm (3/8") seamless copper
- Mechanically expanded into full length fin collars
- Copper return bends stub connections are brazed into expanded tube ends using brazing alloy are available up to 12 rows

- Fins

- Aluminum alloy fins configured sinusoidal type fins
- 8 to 16 fins per inch available

- Distributor

- Seamless copper tube
- Distributor individually sized to coils to minimize pressure drop

- Coil Casing (Coil end plate)

- Mill galvanized sheet metal with full slotted flanges for convenient mounting
- Stainless steel coil casing (Optional)

Coils / Corrosion protection options

- **Copper tubes Aluminum fins coil**

Coils are manufactured from seamless copper tubes mechanically expanded into aluminum fins, with type-L, heavy wall, seamless copper tubes for the coil headers. The evaporator coils are hydrostatic pressure tested in accordance with the UL 1995 -2000 standard. All coils are air pressure tested by dry air up to 3,100 kPa (450 Psi) under water. They also undergo dry cleaning after manufacturing for optimum system cleanness (Standard feature for APSa 50-1 only)

- **Copper tubes Copper fins coil**

Coils are manufactured from seamless copper tubes mechanically expanded into copper fins, with type-L, heavy wall, seamless copper tubes for the coil headers. The condenser coils are hydrostatic pressure tested in accordance with the UL 1995 -2000 standard. All coils are air pressure tested by dry air up to 3,100 kPa (450 Psi) under water. They also undergo dry cleaning after manufacturing for optimum system cleanness

- **Polyurethane Pre-coating (for aluminum fins)**

A water based organic type pre-coated fin designed to give better retained performances compared to typical organic type. The topcoat is made of hydrophilic resin of polyvinyl Alcohol mix with hydrophilic lubricants. It provides a better level of retained as well as improvement in the area of surface friction to help lengthen the life span of a punch dies. Paint is certified as per ASTM 117 A&B up to 3000 hours salt spray test

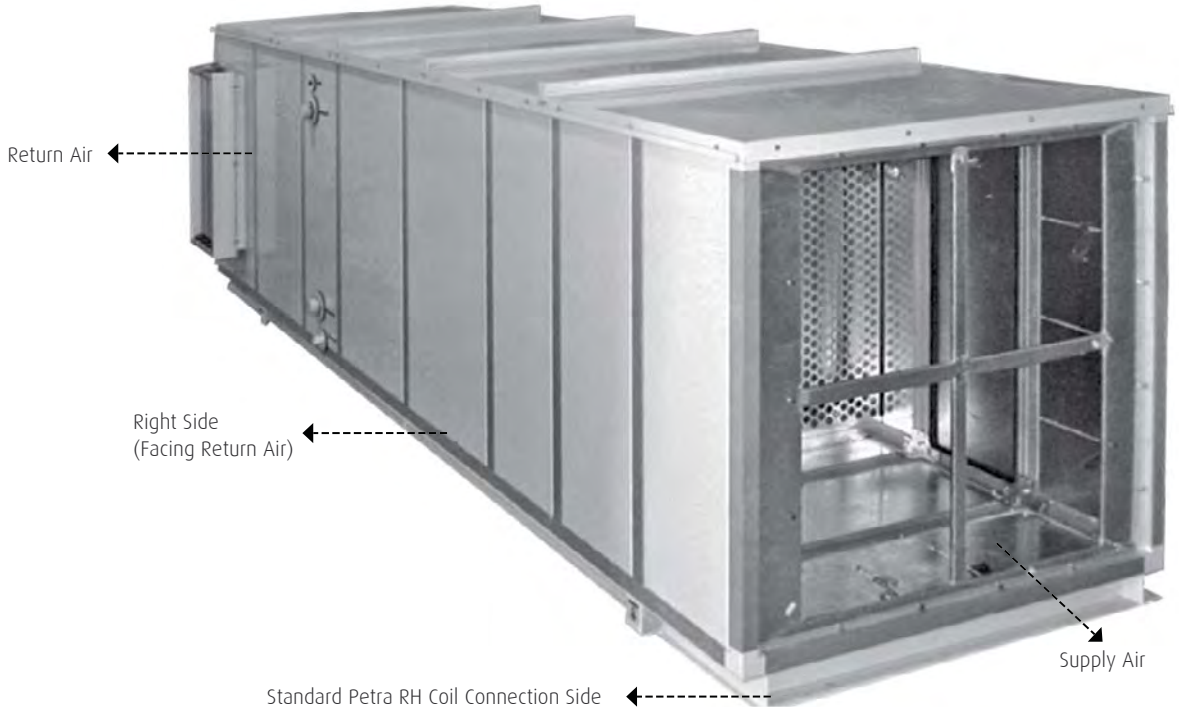
- **Polyurethane Post-coating (for aluminum & copper fins)**

Aliphatic Acrylic Polyurethane type, with high gloss finish with exceptional weathering performance characteristics. Used extensively in virtually all industrial markets, 134 VOC provides a smooth, durable finish that has superior resistance to corrosion, abrasion and chemical exposure. Paint is certified as per ASTM 117 A&B up to 3000-4000 hours salt spray test

Sections and Features

Coils / Connections

- Coil connections can be provided on either right or left hand side facing air return



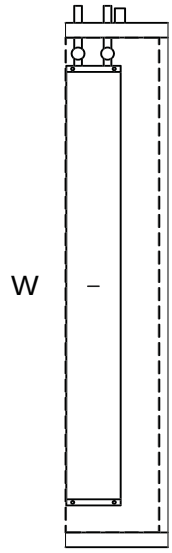
Coils / Drain Pans

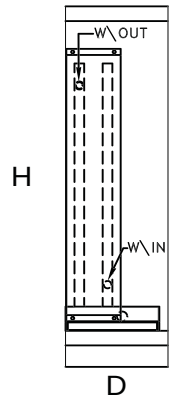
Drain pan is supplied as standard under the cooling coil (chilled water or DX). Drain pan is made of 1.5 mm (0.06 Inch) thick painted galvanized steel with a connection from side, the drain pan is mounted on insulated channel base. The channel base is insulated with 6.4mm (1/4") closed cell foam insulation class "O" to prevent condensation. The drain pan is single sloped drain pan Drain trap design

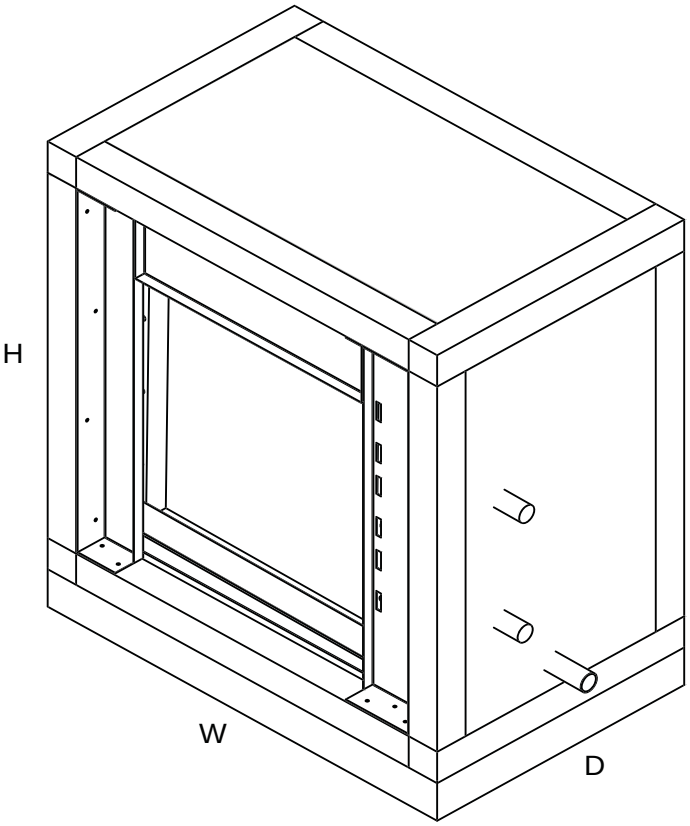
- Options:

- Stainless steel drain pan
- Drain pan connection from both sides
- Double sloped drain pan
- Double skin drain pan with gauge 16 outer with 1.5 mm (0.6 inch) thickness
- Threaded male/female design

Coils / Dimensions





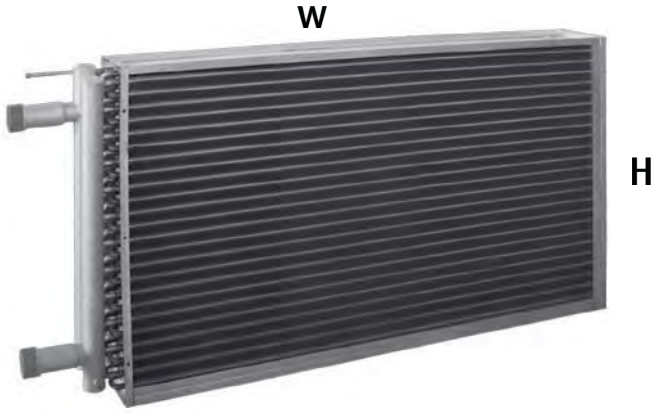


Model (PAH)			12		16		24		32		40		50		62		80	
W	mm	(inch)	850	(33.5)	850	(33.5)	1010	(39.8)	1420	(55.9)	1420	(55.9)	1420	(55.9)	1420	(55.9)	1760	(69.3)
H	mm	(inch)	800	(31.5)	800	(31.5)	960	(37.8)	960	(37.8)	960	(37.8)	1370	(53.9)	1370	(53.9)	1370	(53.9)
D - Small	mm	(inch)	300	(11.8)	300	(11.8)	300	(11.8)	300	(11.8)	300	(11.8)	300	(11.8)	300	(11.8)	300	(11.8)
D - Std	mm	(inch)	500	(19.7)	500	(19.7)	500	(19.7)	500	(19.7)	500	(19.7)	500	(19.7)	500	(19.7)	500	(19.7)
D - Large	mm	(inch)	750	(29.5)	750	(29.5)	750	(29.5)	750	(29.5)	750	(29.5)	750	(29.5)	750	(29.5)	750	(29.5)

Model (PAH)			100		120		150		180		200		250		320		400		450	
W	mm	(inch)	2170	(85.4)	2170	(85.4)	2170	(85.4)	2170	(85.4)	2170	(85.4)	2740	(107.9)	3490	(137.4)	4060	(159.8)	4560	179.5)
H	mm	(inch)	1370	(53.9)	1550	(61.0)	1870	(73.6)	2120	(83.5)	2280	(89.8)	2280	(89.8)	2280	(89.8)	2280	(89.8)	2280	(89.8)
D - Small	mm	(inch)	300	(11.8)	300	(11.8)	300	(11.8)	300	(11.8)	300	(11.8)	300	(11.8)	300	(11.8)	300	(11.8)	300	(11.8)
D - Std	mm	(inch)	500	(19.7)	500	(19.7)	500	(19.7)	500	(19.7)	500	(19.7)	500	(19.7)	500	(19.7)	500	(19.7)	500	(19.7)
D - Large	mm	(inch)	750	(29.5)	750	(29.5)	750	(29.5)	750	(29.5)	750	(29.5)	750	(29.5)	750	(29.5)	750	(29.5)	750	(29.5)

Sections and Features

Coils / Quick selection based on coil face velocity



Model (PAH)	No. of Coils	Standard Coil Dimensions				Coil Face Area	
		Width		Height			
		mm	inch	mm	inch	m^2	ft^2
12	1	483	(19)	483	(19)	0.2	(2.5)
16	1	483	(19)	584	(23)	0.3	(3)
24	1	635	(25)	711	(28)	0.5	(4.9)
32	1	1016	(40)	610	(24)	0.6	(6.7)
40	1	1016	(40)	762	(30)	0.8	(8.3)
50	1	1016	(40)	914	(36)	0.9	(10)
62	1	1016	(40)	1143	(45)	1.2	(12.5)
80	1	1372	(54)	1118	(44)	1.5	(16.5)
100	1	1753	(69)	1067	(42)	1.9	(20.1)
120	1	1753	(69)	1295	(51)	2.3	(24.4)
150	1	1753	(69)	1600	(63)	2.8	(30.2)
180	2	1753	(69)	914	(36)	3.2	(34.5)
200	2	1753	(69)	1016	(40)	3.6	(38.3)
250	2	2286	(90)	1016	(40)	4.7	(50)
320	2	2997	(118)	965	(38)	5.8	(62.3)
400	2	3505	(138)	1016	(40)	7.1	(76.7)
450	2	4064	(160)	1016	(40)	8.2	(88.9)

Note

- Above air flow rate value are based at sea level where air density = 1.2 kg/m3 (0.075 lb/ft3)

- SI

Model (PAH)	FACE VELOCITY (m/s)															
	1.50	1.60	1.70	1.75	1.88	2.00	2.10	2.20	2.25	2.38	2.50	2.63	2.70	2.75	2.88	3.00
	L/s															
12	355	378	402	414	444	473	497	521	532	562	591	621	639	651	680	710
16	429	458	487	501	537	573	602	630	645	680	716	752	773	788	824	859
24	688	734	780	803	860	917	964	1,009	1,033	1,090	1,147	1,204	1,239	1,262	1,319	1,377
32	927	989	1,051	1,082	1,159	1,236	1,298	1,360	1,391	1,468	1,545	1,622	1,669	1,700	1,777	1,854
40	1,129	1,204	1,279	1,317	1,411	1,505	1,580	1,655	1,693	1,787	1,881	1,975	2,032	2,069	2,163	2,257
50	1,451	1,548	1,645	1,693	1,814	1,935	2,032	2,128	2,177	2,298	2,419	2,539	2,612	2,661	2,782	2,902
62	1,773	1,892	2,010	2,069	2,217	2,365	2,483	2,601	2,661	2,808	2,956	3,104	3,193	3,252	3,399	3,547
80	2,336	2,492	2,647	2,725	2,920	3,115	3,270	3,426	3,504	3,699	3,893	4,088	4,205	4,283	4,478	4,672
100	2,849	3,039	3,229	3,324	3,562	3,799	3,989	4,179	4,274	4,511	4,749	4,986	5,129	5,224	5,461	5,698
120	3,362	3,587	3,811	3,923	4,203	4,483	4,707	4,932	5,044	5,324	5,604	5,884	6,052	6,165	6,445	6,725
150	4,274	4,559	4,844	4,986	5,342	5,698	5,983	6,269	6,411	6,767	7,123	7,479	7,693	7,835	8,192	8,548
180	5,020	5,355	5,689	5,857	6,275	6,693	7,028	7,363	7,530	7,949	8,367	8,785	9,036	9,203	9,622	10,040
200	5,529	5,898	6,267	6,451	6,912	7,372	7,741	8,109	8,294	8,755	9,216	9,676	9,953	10,137	10,598	11,059
250	6,937	7,400	7,862	8,093	8,672	9,250	9,712	10,175	10,406	0,984	11,562	12,140	12,487	12,718	13,296	13,874
320	9,049	9,652	10,256	10,557	11,311	12,066	12,669	13,272	13,574	14,328	15,082	15,836	16,288	16,590	17,344	18,098
400	11,397	12,157	12,916	13,296	14,246	15,196	15,956	16,715	17,095	18,045	18,995	19,945	20,514	20,894	21,844	22,794
450	12,584	13,423	14,262	14,681	15,730	16,778	17,617	18,456	18,876	19,924	20,973	22,022	22,651	23,070	24,119	25,168

- IMP

Model (PAH)	FACE VELOCITY (FPM)															
	300	320	340	350	375	400	420	440	450	475	500	525	540	550	575	600
	CFM															
12	752	801	852	877	941	1,002	1,053	1,104	1,127	1,191	1,252	1,316	1,354	1,380	1,441	1,505
16	909	971	1,032	1,062	1,138	1,214	1,276	1,335	1,367	1,441	1,517	1,594	1,638	1,670	1,746	1,820
24	1,458	1,555	1,653	1,702	1,822	1,943	2,043	2,138	2,189	2,310	2,431	2,551	2,626	2,674	2,795	2,918
32	1,964	2,096	2,227	2,293	2,456	2,619	2,751	2,882	2,948	3,111	3,274	3,437	3,537	3,602	3,766	3,929
40	2,392	2,551	2,710	2,791	2,990	3,189	3,348	3,507	3,588	3,787	3,986	4,185	4,306	4,384	4,584	4,783
50	3,075	3,280	3,486	3,588	3,844	4,100	4,306	4,509	4,613	4,870	5,126	5,380	5,535	5,639	5,895	6,150
62	3,757	4,009	4,259	4,384	4,698	5,012	5,262	5,512	5,639	5,950	6,264	6,578	6,766	6,891	7,203	7,516
80	4,950	5,281	5,609	5,775	6,188	6,601	6,929	7,260	7,425	7,839	8,250	8,663	8,911	9,076	9,489	9,900
100	6,037	6,440	6,843	7,044	7,548	8,050	8,453	8,856	9,057	9,559	10,064	10,566	10,869	11,070	11,572	12,075
120	7,124	7,601	8,076	8,313	8,907	9,500	9,975	10,451	10,689	11,282	11,875	12,469	12,825	13,064	13,658	14,251
150	9,057	9,661	10,265	10,566	11,320	12,075	12,679	13,285	13,586	14,340	15,094	15,849	16,302	16,603	17,360	18,114
180	10,638	11,348	12,056	12,412	13,297	14,183	14,893	15,603	15,957	16,845	17,731	18,616	19,148	19,502	20,390	21,276
200	11,717	12,498	13,280	13,670	14,647	15,622	16,404	17,184	17,576	18,553	19,530	20,504	21,091	21,481	22,458	23,435
250	14,700	15,681	16,660	17,150	18,377	19,602	20,581	21,562	22,051	23,276	24,501	25,726	26,461	26,951	28,176	29,400
320	19,176	20,454	21,733	22,371	23,969	25,569	26,847	28,125	28,765	30,362	31,960	33,558	34,516	35,156	36,754	38,351
400	24,151	25,762	27,370	28,176	30,189	32,202	33,812	35,421	36,226	38,239	40,252	42,265	43,471	44,276	46,290	48,303
450	26,667	28,445	30,223	31,111	33,333	35,554	37,332	39,110	40,000	42,221	44,444	46,667	48,000	48,888	51,111	53,334

Sections and Features

Fans / Features

Petra fans for air handling units (PAH) are high performance centrifugal fans, The unit can be equipped with different types of fans depends on the client targeted initial and operational costs and system static pressure. The impeller size selection criterion is based on compromising between efficiency, initial cost, desired acoustic level and the available space for the unit

- Nomenclature

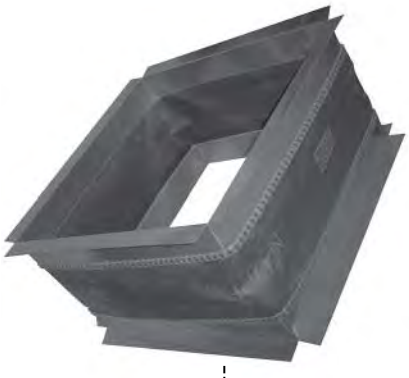
Petra [X X X] [X]

Wheel Diameter

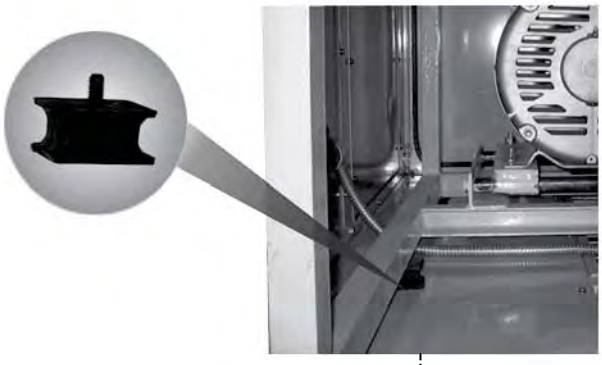
Fan Type
F : Forward Curved
B : Backward Curved
A : Airfoil Curved
P : Plenum

Standard Features for All Fans

- All Petra Air Handling Unit fans are AMCA certified
- All fans are selected for optimum outlet velocities and low sound levels
- Fans are supplied with flexible connection between the fan discharge outlet and the unit casing (or xx for SWSI fans); this will minimize the vibration and accordingly the sound level and completely isolate the fan-motor assembly from the rest of the unit structure
- The fan shaft is made of steel machined, grounded, polished and epoxy coated to provide maximum rust protection
- The shaft diameter is selected with maximum operational speed; will be generously below the first critical speed
- The fan/motor assembly is mounted on rubber on shear vibration isolation mounting



Flexible connection

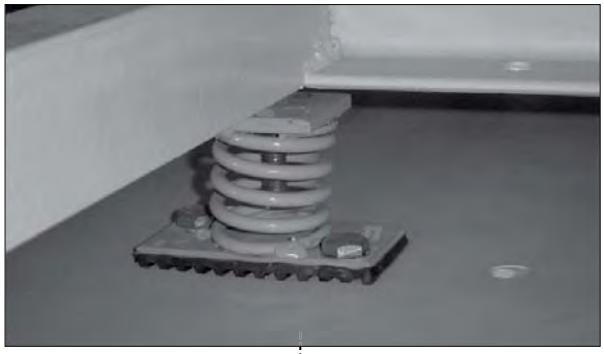


Rubber in Shear Isolator

Fans / Features

Optional Features for All Fans

- Non-standard fan sizes
- Pillow block bearing fans; the bearing is mounted on cast iron supports with grease points
- Stainless steel fan shaft
- Fan inlet measuring element mounted on the fan bell mouth
- Double grooved fan sheaves
- Inlet guide vanes for backward curved fans and airfoil fans to control air flow rate
- Twelve blades impeller for airfoil plenum fans for very quiet operation
- Aluminum fan impeller
- 1.0" open type, 2.0" seismic or 4.0" seismic vibration isolation mounting for fan/motor assembly
- Wire mesh on the fan inlet
- Fan/motor drive assembly belt guard
- Extended lubrication lines
- Externally mounted motor with extended shaft
- Piezometer ring air flow measurement
- The twin fans arrangement. This arrangement is the best choice for low height units
- The fan array construction



1.0" Open type spring isolator

2.0" Seismic type spring isolator

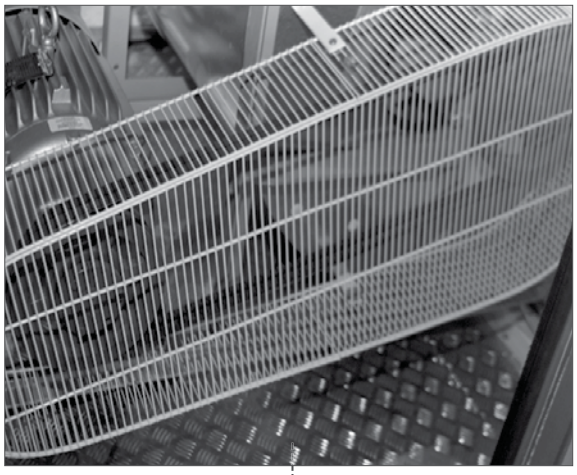
Sections and Features

Fans / Fan Motor

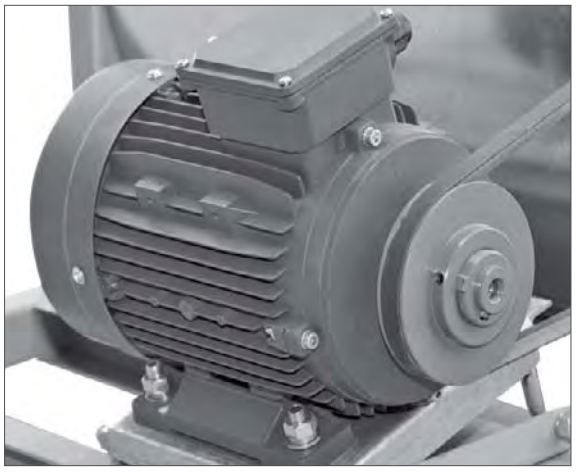
The fan motors are mounted on a galvanized steel base which is isolated from the AHU unit casing with rubber mounts as standard. All motors with (7.5 hp)
(Where applicable) or less are provided with variable pitch pulley for the motor and fixed pulley for the fan. Motors are Totally Enclosed Fan Cooled (TEFC), squirrel cage type with 4 Pole class "F" insulation and IP 55 protection

Optional features for fan motors

- Explosion proof motors
- Two speed motors
- Standby motors with manual or automatic change over
- Frequency inverter
- Circuit breaker
- Motor contactor
- Spring vibration isolators
- Premium efficiency motors
- Class H insulation motors
- 2 & 6 poles motors
- Belt guard on fan-motor construction



Belt Guard



Fan Motor

Fans / Double Width Double Inlet (DWDI) Centrifugal Type

Forward Curved Fan (Standard)

- First choice for low/medium and high static pressure systems
- Best affordable price for client budget

DWDI Fan-Forward Curved Fan

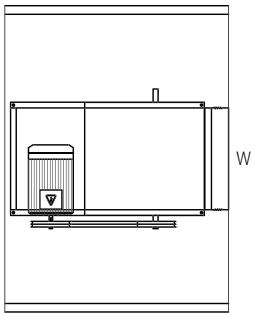
Backward Curved Fan (Optional)

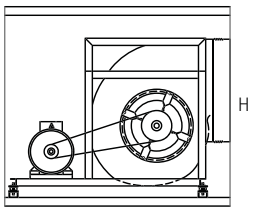
- Made of high efficiency backward inclined blades
- High performance and lower sound level
- Special design impellers built from mild steel
- Impellers are welded, treated and painted with alchidic-melamminic paint
- Statically and dynamically balanced according to ISO 1940

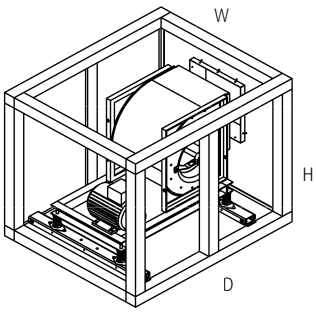
Airfoil Backward Curved Fan (Optional)

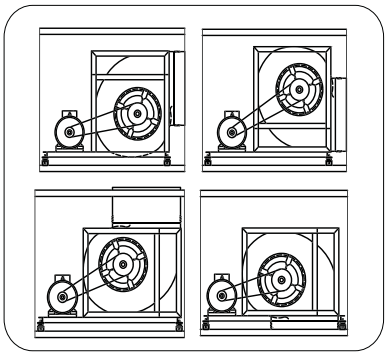
- Airfoil and flat shaped blades design
- Lower operational costs due to higher static efficiency
- Lower sound level which makes the whole unit quitter

(DWDI) Backward Curved Fan









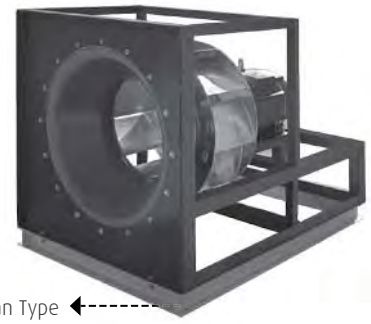
Model (PAH)			12		16		24		32		40		50		62		80	
W	mm	(inch)	850	(33.5)	850	(33.5)	1010	(39.8)	1420	(55.9)	1420	(55.9)	1420	(55.9)	1420	(55.9)	1760	(69.3)
H	mm	(inch)	800	(31.5)	800	(31.5)	960	(37.8)	960	(37.8)	960	(37.8)	1370	(53.9)	1370	(53.9)	1370	(53.9)
D	mm	(inch)	950	(37.4)	950	(37.4)	950	(37.4)	1200	(47.2)	1200	(47.2)	1450	(57.1)	1450	(57.1)	1450	(57.1)

Model (PAH)			100		120		150		180		200		250		320		400		450	
W	mm	(inch)	2170	(85.4)	2170	(85.4)	2170	(85.4)	2170	(85.4)	2170	(85.4)	2740	(107.9)	3490	137.4)	4060	(159.8)	4560	(179.5)
H	mm	(inch)	1370	(53.9)	1550	(61.0)	1870	(73.6)	2120	(83.5)	2280	(89.8)	2280	(89.8)	2280	(89.8)	2280	(89.8)	2280	(89.8)
D	mm	(inch)	1660	65.4)	1660	(65.4)	1660	(65.4)	1660	(65.4)	1660	(65.4)	1910	(75.2)	1910	(75.2)	1910	(75.2)	1910	(75.2)

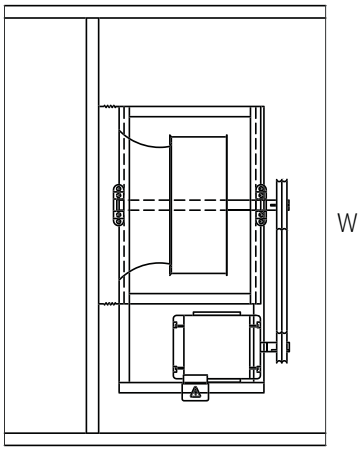
Sections and Features

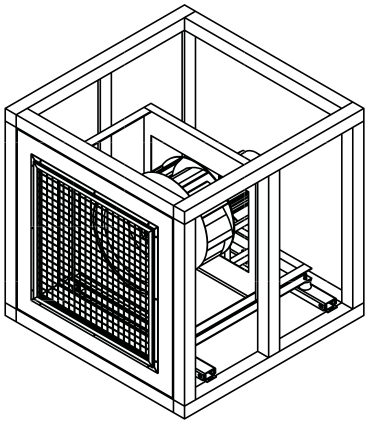
Fans / Single Width Single Inlet (SWSI) Plenum Type

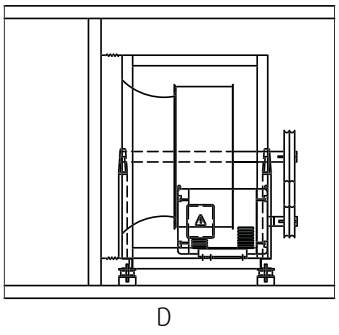
- Plenum fans are used to pressurize the entire surrounding air plenum
- This allow discharge duct work to be directly connected to the air handler from any direction
- The plenum fan design also saves space by eliminating the fan housing, transitions and diffusers within the air handling unit
- Plenum fans can be belt driven or direct driven

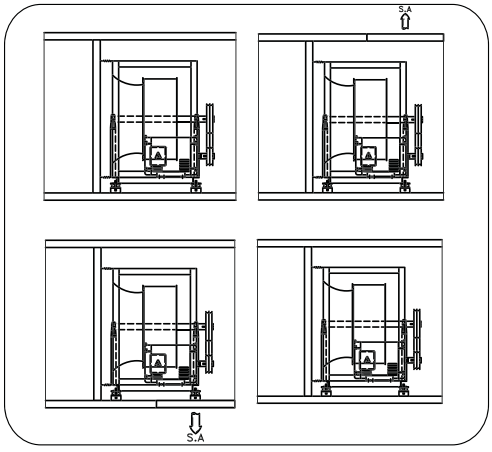


Plenum Fan Type









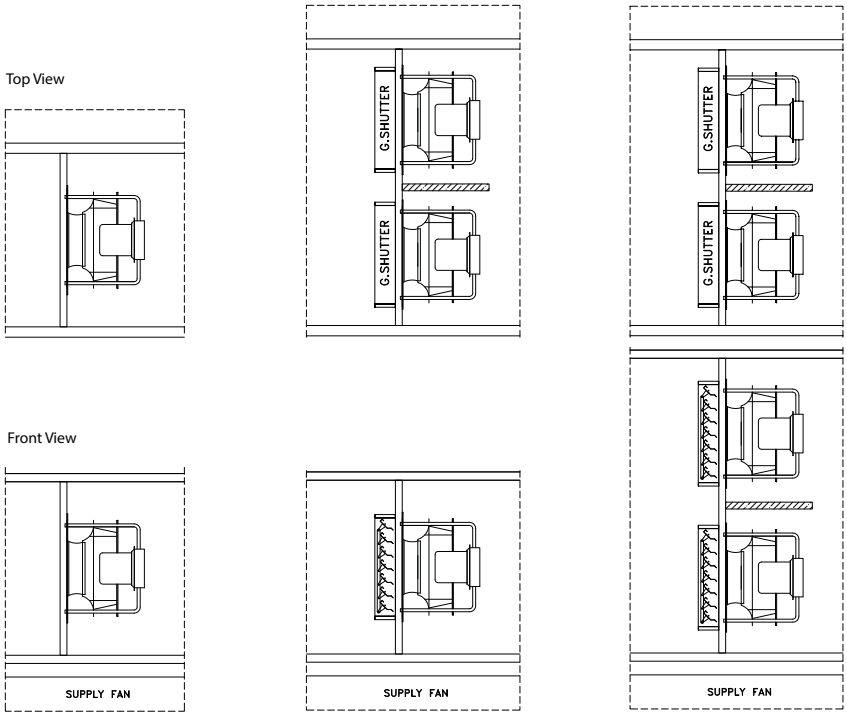
Model (PAH)			12		16		24		32		40		50		62		80	
W	mm	(inch)	850	(33.5)	850	(33.5)	1010	(39.8)	1420	(55.9)	1420	(55.9)	1420	(55.9)	1420	(55.9)	1760	(69.3)
H	mm	(inch)	800	(31.5)	800	(31.5)	960	(37.8)	960	(37.8)	960	(37.8)	1370	(53.9)	1370	(53.9)	1370	(53.9)
D	mm	(inch)	950	(37.4)	950	(37.4)	950	(37.4)	1200	(47.2)	1200	(47.2)	1450	(57.1)	1450	(57.1)	1450	(57.1)

Model (PAH)			100		120		150		180		200		250		320		400		450	
W	mm	(inch)	2170	(85.4)	2170	(85.4)	2170	(85.4)	2170	(85.4)	2170	(85.4)	2740	(107.9)	3490	(137.4)	4060	(159.8)	4560	(179.5)
H	mm	(inch)	1370	(53.9)	1550	(61.0)	1870	(73.6)	2120	(83.5)	2280	(89.8)	2280	(89.8)	2280	(89.8)	2280	(89.8)	2280	(89.8)
D	mm	(inch)	1660	(65.4)	1660	(65.4)	1660	(65.4)	1660	(65.4)	1660	(65.4)	1910	(75.2)	1910	(75.2)	1910	(75.2)	1910	(75.2)

Fans / Single Width Single Inlet (SWSI) EC Type

- EC fans are used to increase energy efficiency and provide supply fan technology control operation
- EC fan are powered by energy saving EC motors. The electronically controlled EC fan motor reacts steplessly through “the piece of art” unit controller to changing output requirements
- EC fan motors can run at partial loads in energy saving mode and are unaffected by voltage fluctuations
- EC fan motors consume up to 30% less energy than conventional fan/ motor assemblies and provide variable speed control through a signal from unit controller
- EC fan motors characteristics:
  1. Up to 92% motor efficiency, resulting in substantial lower operating cost
  2. Quiet running, long life and maintenance free
  3. Stepless load tracking to prevailing conditions

EC Fan Type



1 Fan 2 Fans 3 Fans

Model (PAH)			12		16		24		32		40		50		62		80	
W	mm	(inch)	850	(33.5)	850	(33.5)	1010	(39.8)	1420	(55.9)	1420	(55.9)	1420	(55.9)	1420	(55.9)	1760	(69.3)
H	mm	(inch)	800	(31.5)	800	(31.5)	960	(37.8)	960	(37.8)	960	(37.8)	1370	(53.9)	1370	(53.9)	1370	(53.9)
D	mm	(inch)	1200	(47.2)	1200	(47.2)	1200	(47.2)	1200	(47.2)	1410	(55.5)	1410	(55.5)	1410	(55.5)	1660	(65.4)

Model (PAH)			100		120		150		180		200		250		320		400		450	
W	mm	(inch)	2170	(85.4)	2170	(85.4)	2170	(85.4)	2170	(85.4)	2170	(85.4)	2740	(107.9)	3490	(137.4)	4060	(159.8)	4560	(179.5)
H	mm	(inch)	1370	(53.9)	1550	(61.0)	1870	(73.6)	2120	(83.5)	2280	(89.8)	2280	(89.8)	2280	(89.8)	2280	(89.8)	2280	(89.8)
D	mm	(inch)	1660	(65.4)	1660	(65.4)	1660	(65.4)	1660	(65.4)	1660	(65.4)	1660	(65.4)	1660	(65.4)	1660	(65.4)	1660	(65.4)

Sections and Features

Heat Recovery / Energy Wheel

Petra uses Energy Recovery Wheels (sensible & enthalpy) in their Air Handling units as an energy recovery solution meeting the ASHRAE ventilation & energy standards, while improving indoor air quality and reducing total HVAC equipment capacity

Using the exhaust energy is a cost-efficient, sustainable and quick way to reduce global energy consumption and give better indoor air quality (IAQ) and protect buildings and environment

Petra standard energy wheel is aluminum, polymer type energy wheel is available as optional

- High efficiency using 200 mm (8 inch) depth wheel
- Best solution for cross contamination (purge angle, when speed & wheel free opening)
- Easy retrofits and replacements due to rotor construction
- Easy maintenance using air blow & vacuum cleaning

Energy Wheel (Aluminum)

Rotor

- Enthalpy heat and humidity recovery wheels shall be manufactured of aluminum treated for corrosion resistance and shall include a low co-adsorption Ion Exchange Resin (IER) media to adsorb and transfer humidity in the vapor phase

Benefits of using rotors with Ion Exchange Resin media "IER"

- IER unlike silica gel or molecular sieve, doesn't have "pores" and yet has storage capacity
- IER has the lowest co-adsorption coefficient in the industry; it is even lower than the 3A molecular sieve
- Wheel surfaces are to be ground and polished smooth for long seal life and to prevent annular cross contamination between the air streams
- Design to keep negative pressure in both the supply & exhaust streams to keep the wheel in place with no tilting or air flowing from the exhaust side to the supply side

Heat Recovery / Energy Wheel

Cassette

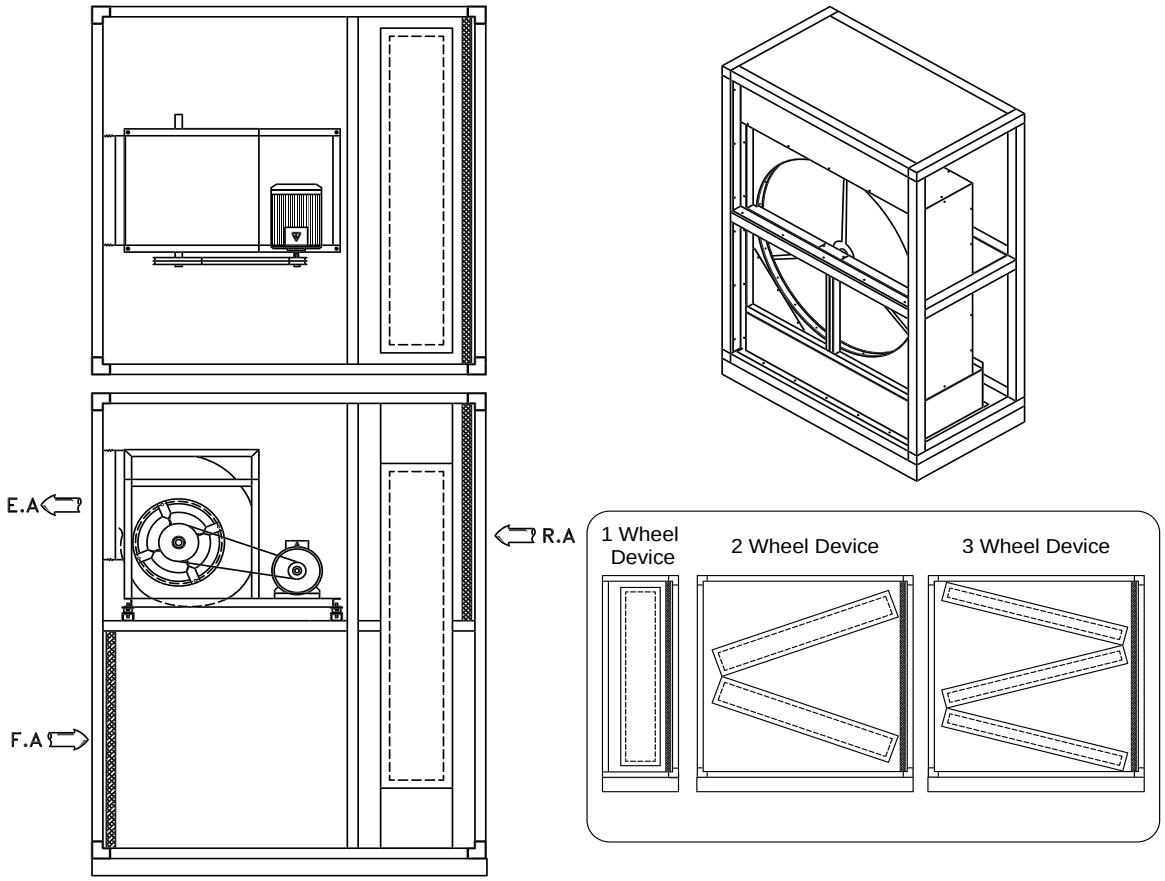
- The cassette of the rotary heat exchanger shall have a built-in purge section providing a minimum cross contamination of exhaust air. The cassette shall be constructed of a minimum of 10-gauge steel to ensure rigidity and stability. Casing side panels shall be removable to provide easy access to internal parts
- **Purge:** Cassette shall be complete with a built-in purge section to prevent carry-over of exhaust air to the supply air stream
- **Seals:** Supply and exhaust air stream shall be isolated from each other by means of adjustable seals secured to the cassettes panels and duct dividers. Seals shall consist of a double layer of neoprene wiper seals. The seals shall be installed in contact with the wheel flange in order to minimize leakage between the supplies and exhaust air systems

Options

- By-Pass dampers with controlled actuator
- Recirculation dampers with controlled actuator
- VFD for freeze protection
- Rotation failure detector
- SS drain pan under in the energy wheel section

Sections and Features

Heat Recovery / Energy Wheel



Model (PAH)			12		16		24		32		40		50		62		80	
W	mm	(inch)	850	(33.5)	850	(33.5)	1010	(39.8)	1420	(55.9)	1420	(55.9)	1420	(55.9)	1420	(55.9)	1760	(69.3)
H	mm	(inch)	800	(31.5)	800	(31.5)	960	(37.8)	960	(37.8)	960	(37.8)	1370	(53.9)	1370	(53.9)	1370	(53.9)
D	mm	(inch)	750	(29.5)	750	(29.5)	750	(29.5)	750	(29.5)	750	(29.5)	750	(29.5)	750	(29.5)	750	(29.5)

Model (PAH)			100		120		150		180		200		250		320		400		450	
W	mm	(inch)	2170	(85.4)	2170	(85.4)	2170	(85.4)	2170	(85.4)	2170	(85.4)	2740	(107.9)	3490	(137.4)	4060	(159.8)	4560	(179.5)
H	mm	(inch)	1370	(53.9)	1550	(61.0)	1870	(73.6)	2120	(83.5)	2280	(89.8)	2280	(89.8)	2280	(89.8)	2280	(89.8)	2280	(89.8)
D	mm	(inch)	750	(29.5)	750	(29.5)	2150	(84.6)	2150	(84.6)	2150	(84.6)	2150	(84.6)	2150	(84.6)	2150	(84.6)	2150	(84.6)

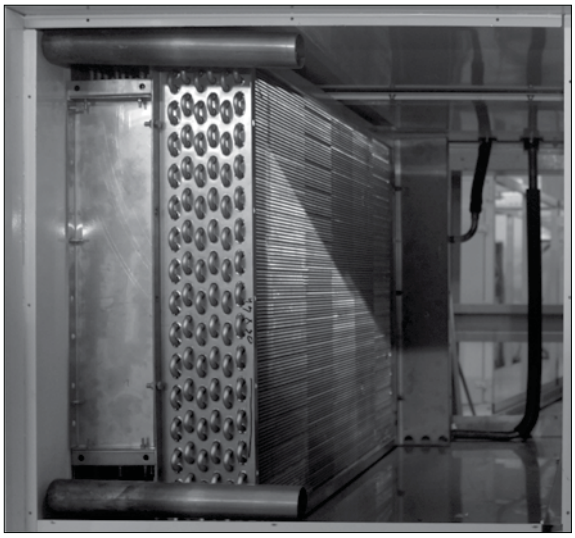
Heat Recovery / Heat Pipe

Heat Pipe Recovery or Humidification coil assembly is whose operational principal is based on NATURAL/FREE ENERGY of an evaporation/condensation of a fluid inside a closed loop coil assembly without the need of a pump. The fluid flows between the two coil sides in the closed loop by changing phase between gas and fluid and utilizing the fluid and gas characteristics to move around

Petra builds and tests their own Heat Pipe coils inside the factory. Heat Pipe coils are manufactured from 3/8" seamless copper tubes mechanically expanded to aluminum fins

Benefits

- High Energy Efficiency Ratio (EER)
- Reduce the electrical consumption and also reduce the MCA/MOP at site
- Reduce weight of the unit compared to other energy recovery solutions such as fixed plate heat exchanger or recovery wheel
- Easy maintenance
- Smaller foot print unit



A. Recovery Type:

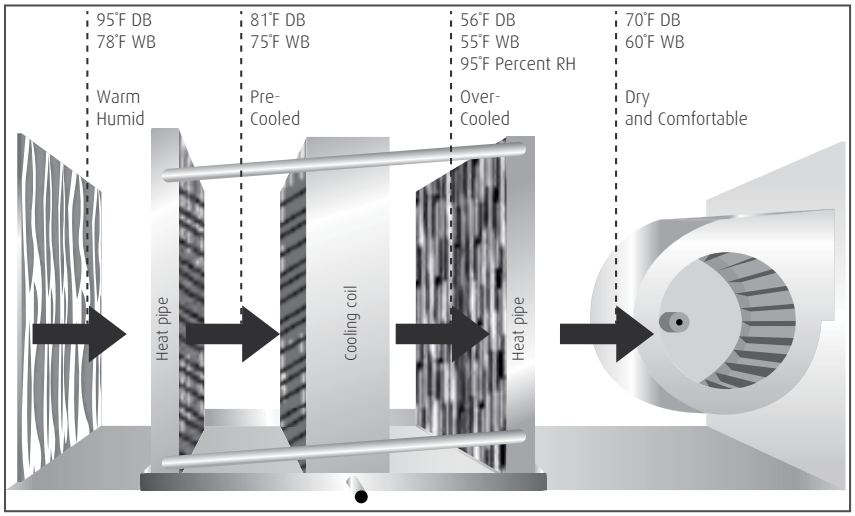
- Recovery heat pipe can be used in one season (summer or winter) ONLY and can be installed in a double deck or side by side unit designs
- Petra recovery heat pipe utilizes two coils filled with a refrigerant in a closed circuit design. The energy exchange between the supply and exhaust streams will create a enough force to change the phase of the refrigerant between vapor and liquid and thus creating a difference n pressure allowing gas to flow between the two coils without the need of a pump

Sections and Features

Heat Recovery / Heat Pipe

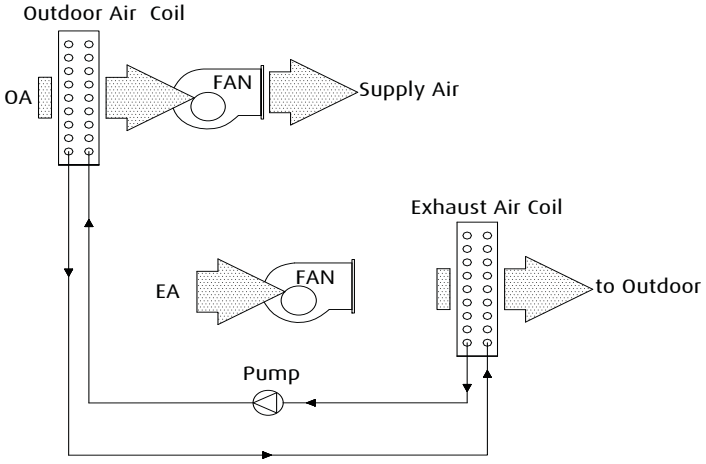
B. Humidification Type:

- Dehumidification heat pipe is place as a wraparound coil assembly around a cooling source, namely a chiller water or DX coil
- Petra dehumidification heat pipe is used where humidity treatment is required for 100% make up AHU providing a non cross contamination solution to reduce humidity without any extra cost. it utilizes two coils filled with a refrigerant in a closed circuit design wrapped around a DX or chilled water coil
- It consists of a pre-cool coil (upstream of the DX/CWC) and a reheat coil (downstream of the DX/CWC). The energy exchange between the humid hot OA hitting the pre-cool and cold dehumidified air exiting the DX/CWC and hitting the reheat coil will create enough force to change the phase of the refrigerant between vapor and liquid and thus creating a difference in pressure allowing gas to flow between the two coils without the need a pump
- Petra's dehumidification heat pipe reduces 15-20% of the mechanical cooling consumption (compressor HP) and thus raise the unit operating efficiency at full load



Heat Recovery / Run Around Coils

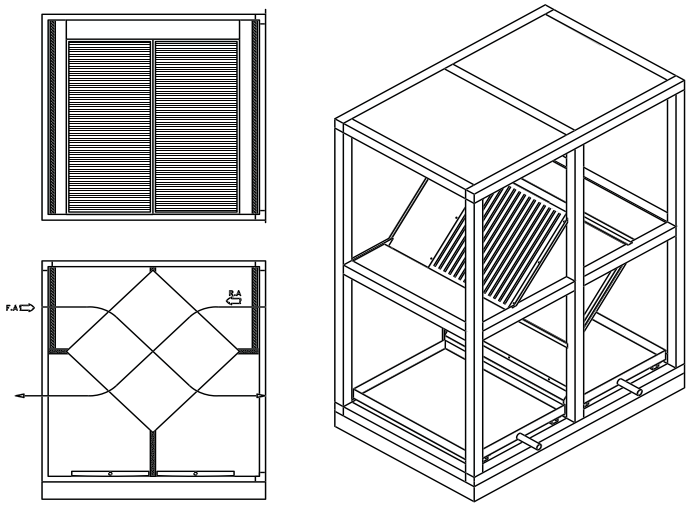
Run Around Coils consists of two finned-tube coils (air to water heat exchangers) piped together one coil is in the outdoor air stream and the other is in the exhaust air stream. This type is limited to sensible energy heat transfer

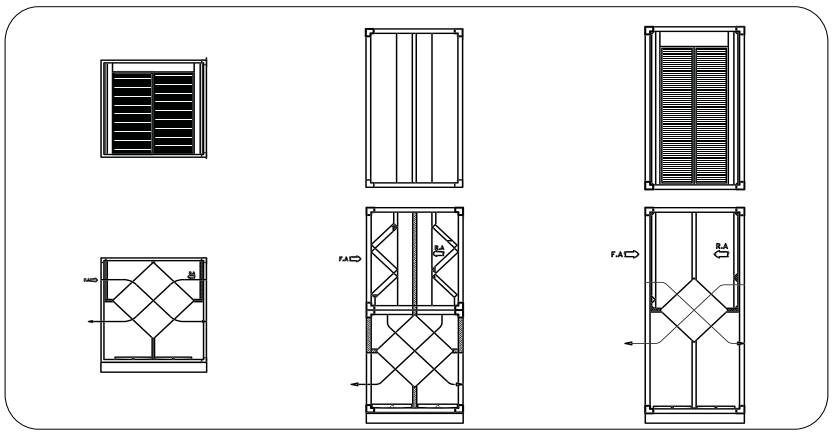


Typical Run-Around Energy Recovery Loop

Heat Recovery / Cross Flow Heat Exchanger (Fixed Plate Exchanger)

This type of heat recover relies on the thermal conduction for energy recovery, it consists of alternate Layers of plates separated and sealed, and this type is limited to sensible energy recovery. Cross flow heat exchangers are used in double deck units. Enthalpy type is available as optional feature





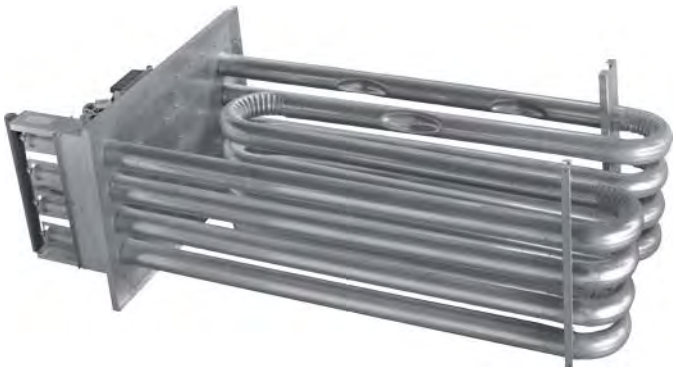
Model (PAH)			12		16		24		32		40		50		62		80	
W	mm	(inch)	850	(33.5)	850	(33.5)	1010	(39.8)	1420	(55.9)	1420	(55.9)	1420	(55.9)	1420	(55.9)	1760	(69.3)
H	mm	(inch)	800	(31.5)	800	(31.5)	960	(37.8)	960	(37.8)	960	(37.8)	1370	(53.9)	1370	(53.9)	1370	(53.9)
D	mm	(inch)	1450	(57.1)	1450	(57.1)	1450	(57.1)	1450	(57.1)	1450	(57.1)	1450	(57.1)	1450	(57.1)	1870	(73.6)

Model (PAH)			100		120		150		180		200		250		320		400		450	
W	mm	(inch)	2170	(85.4)	2170	(85.4)	2170	(85.4)	2170	(85.4)	2170	(85.4)	2740	(107.9)	3490	(137.4)	4060	(159.8)	4560	(179.5)
H	mm	(inch)	1370	(53.9)	1550	(61.0)	1870	(73.6)	2120	(83.5)	2280	(89.8)	2280	(89.8)	2280	(89.8)	2280	(89.8)	2280	(89.8)
D	mm	(inch)	1870	(73.6)	1870	(73.6)	1870	(73.6)	1870	(73.6)	1870	(73.6)	1870	(73.6)	1870	(73.6)	1870	(73.6)	1870	(73.6)

Sections and Features

Other Sections / Gas Heater

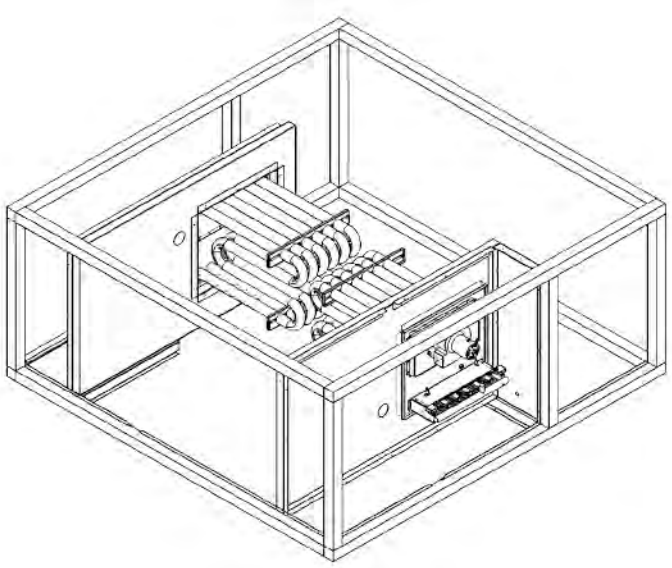
Tubular type gas heater completely assembled and wired system integral within the air conditioning unit for both outdoor and indoor applications taking into consideration availability of fresh air in the unit space. The heat exchanger has been designed to provide maximum and uniform heat transfer with low pressure drop for the gas and curved non-welded serpentine design experiences less thermally induced stress making it highly durable for longer service life and manufactured from heavy duty 20-guage aluminized steel as standard and available with 409 stainless steel material as an option. (Drum & tube design is available)

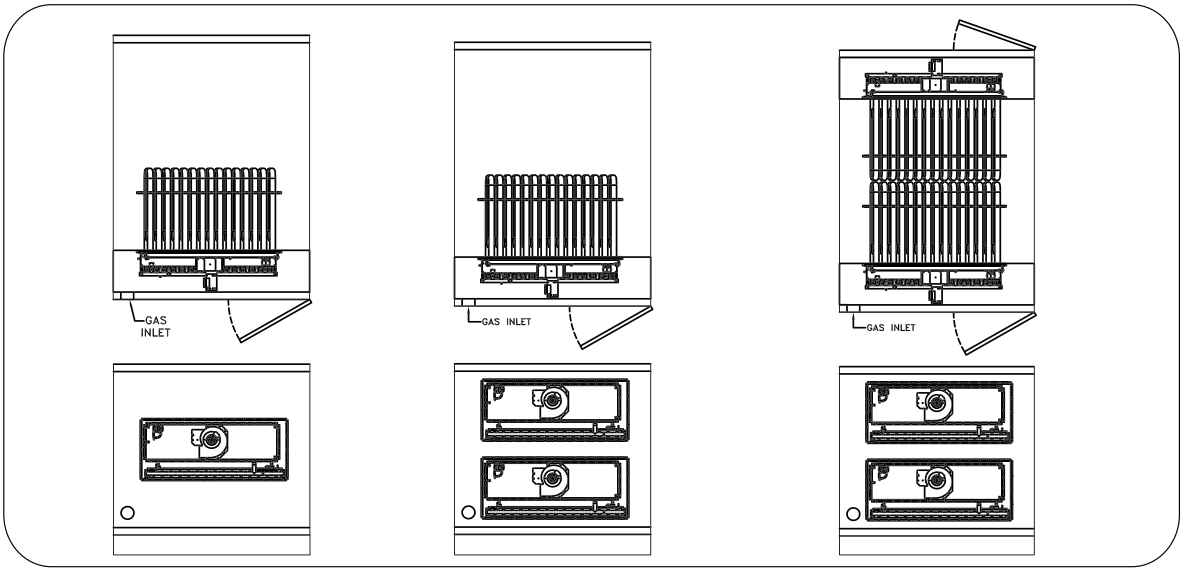


The ignition system is automatic and is done through a process called flame rectification where flame conducts a very small amount of electricity then the pilot flame; thus igniting the main burner flames. So an intermittent ignition system is used in our gas heater. Venting system of Petra gas heater is certified in accordance with category (I) and (III) venting requirements, this venting flexibility makes the site installation easier and more cost effective. This venting system is provided with centrifugal fan drafter assembly which includes a pressure switch in order to protect the unit from back or closed drafter. Our gas heater is also provided with a complete gas shut off and a purge period of 5 minutes

Our standard gas heater is supplied with one stage gas valve; 2- stage gas valve or electronic modulation gas valve can be provided as an option. This modulating valve is mounted between standard gas control valve and burner manifold and is fully open with no power applied to it

And the minimum ratio we can reach is 50% of full input rate and then it is fully modulated from 50% to 100% for units containing one gas heater. Our turn down ratio can be lowered to 25% when using two-gas heaters in one unit and less when using three-gas heaters in one unit





Model (PAH)			12	16	24	32	40	50	62	80
W	mm	(inch)	850 (33.5)	850 (33.5)	1010 (39.8)	1420 (55.9)	1420 (55.9)	1420 (55.9)	1420 (55.9)	1760 (69.3)
H	mm	(inch)	800 (31.5)	800 (31.5)	960 (37.8)	960 (37.8)	960 (37.8)	1370 (53.9)	1370 (53.9)	1370 (53.9)
D	mm	(inch)	N/A	N/A	N/A	1200 (47.2)	1200 (47.2)	1660 (65.4)	1660 (65.4)	1660 (65.4)

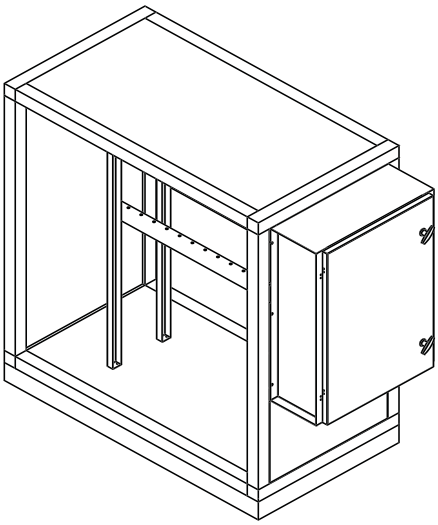
Model (PAH)			100	120	150	180	200	250	320	400	450
W	mm	(inch)	2170 (85.4)	2170 (85.4)	2170 (85.4)	2170 (85.4)	2170 (85.4)	2740 (107.9)	3490 (137.4)	4060 (159.8)	4560 (179.5)
H	mm	(inch)	1370 (53.9)	1550 (61.0)	1870 (73.6)	2120 (83.5)	2280 (89.8)	2280 (89.8)	2280 (89.8)	2280 (89.8)	2280 (89.8)
D	mm	(inch)	1660 (65.4)	1660 (65.4)	1660 (65.4)	1660 (65.4)	1660 (65.4)	1660 (65.4)	1660 (65.4)	1660 (65.4)	1660 (65.4)

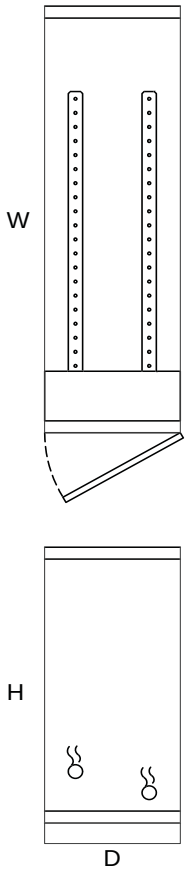
Sections and Features

Other Sections / Steam Humidifier

Various types of humidifiers are available depending on the application, and it can be supplied with or without controllers, sensors and all necessary hardware

These types include the following:





A. Self-contained steam cylinder type

By using immersed electrodes, the steam cylinder stainless steel steam distribution pipe is complete with electronic controls for water level regulation and automatic flushing

B. Electric pan humidifier

Air is humidified by evaporating water in a painted galvanized sheet metal tank using electric element heaters. The humidifier tank is provided with a float valve, drainage output, quick-fill opening and a water level switch

Model (PAH)			12		16		24		32		40		50		62		80	
W	mm	(inch)	850	(33.5)	850	(33.5)	1010	(39.8)	1420	(55.9)	1420	(55.9)	1420	(55.9)	1420	(55.9)	1760	(69.3)
H	mm	(inch)	800	(31.5)	800	(31.5)	960	(37.8)	960	(37.8)	960	(37.8)	1370	(53.9)	1370	(53.9)	1370	(53.9)
D	mm	(inch)	750	(29.5)	750	(29.5)	750	(29.5)	750	(29.5)	750	(29.5)	750	(29.5)	750	(29.5)	750	(29.5)

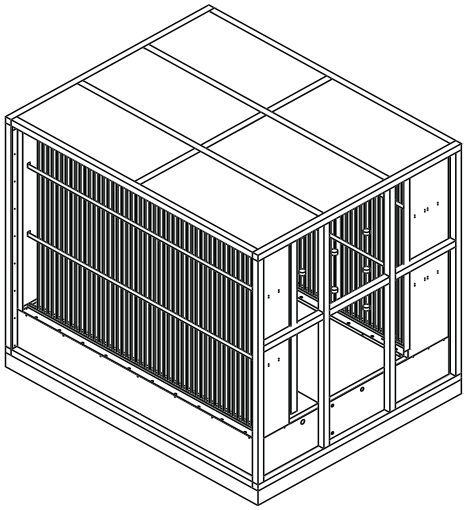
Model (PAH)			100		120		150		180		200		250		320		400		450	
W	mm	(inch)	2170	(85.4)	2170	(85.4)	2170	(85.4)	2170	(85.4)	2170	(85.4)	2740	(107.9)	3490	(137.4)	4060	(159.8)	4560	(179.5)
H	mm	(inch)	1370	(53.9)	1550	(61.0)	1870	(73.6)	2120	(83.5)	2280	(89.8)	2280	(89.8)	2280	(89.8)	2280	(89.8)	2280	(89.8)
D	mm	(inch)	750	(29.5)	750	(29.5)	750	(29.5)	750	(29.5)	750	(29.5)	750	(29.5)	750	(29.5)	750	(29.5)	750	(29.5)

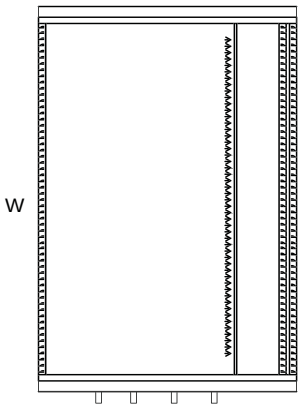
Other Sections / Air Washer

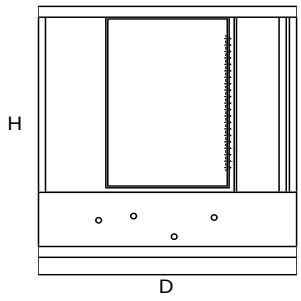
The air washer section comes complete with:

- Stand pipes with spray nozzles that supply fine water mist
- PVC plates specially shaped to form droplet eliminators
- Water pump equipped with the following openings:
    - Drain connection
    - Supply connection
    - Suction connection
    - Overflow
    - Quick-fill
- Inspection window and access door

Air Washer







Model (PAH)			12		16		24		32		40		50		62		80	
W	mm	(inch)	850	(33.5)	850	(33.5)	1010	(39.8)	1420	(55.9)	1420	(55.9)	1420	(55.9)	1420	(55.9)	1760	(69.3)
H	mm	(inch)	800	(31.5)	800	(31.5)	960	(37.8)	960	(37.8)	960	(37.8)	1370	(53.9)	1370	(53.9)	1370	(53.9)
D	mm	(inch)	2150	(84.6)	2150	(84.6)	2150	(84.6)	2150	(84.6)	2150	(84.6)	2150	(84.6)	2150	(84.6)	2150	(84.6)

Model (PAH)			100		120		150		180		200		250		320		400		450	
W	mm	(inch)	2170	(85.4)	2170	(85.4)	2170	(85.4)	2170	(85.4)	2170	(85.4)	2740	(107.9)	3490	(137.4)	4060	(159.8)	4560	(179.5)
H	mm	(inch)	1370	(53.9)	1550	(61.0)	1870	(73.6)	2120	(83.5)	2280	(89.8)	2280	(89.8)	2280	(89.8)	2280	(89.8)	2280	(89.8)
D	mm	(inch)	2150	(84.6)	2150	(84.6)	2150	(84.6)	2150	(84.6)	2150	(84.6)	2150	(84.6)	2150	(84.6)	2150	(84.6)	2150	(84.6)

Sections and Features

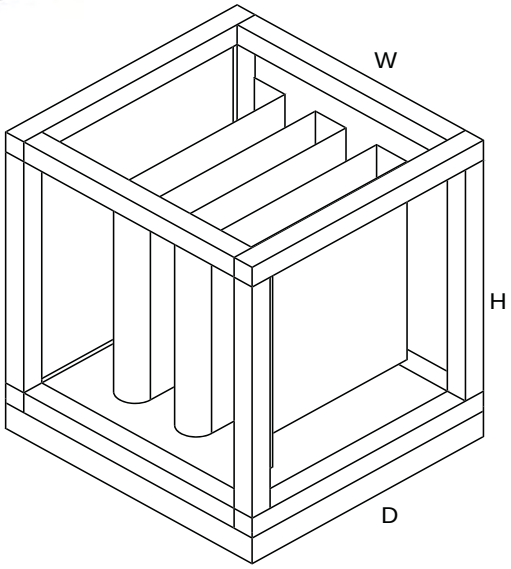
Other Sections / Sound Attenuator

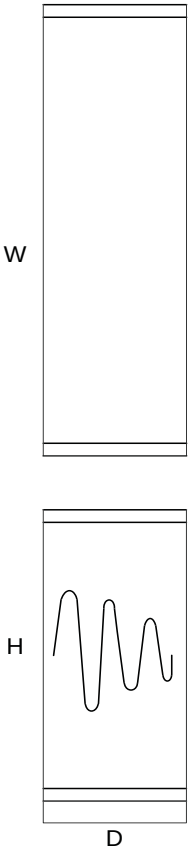
Sound attenuator can be provided where a significant reduction of fan noise is required. Sound absorption is achieved by installing mineral wool splitters, fixed in galvanized steel frames and mounted parallel to the airflow. Various splitter lengths are available to provide a range of attenuator performances

The sides exposed to the air stream are covered with a glass fiber scrim to avoid erosion to the mineral wool by the air stream. The standard thickness of the splitters is 7.9 inch

Sound attenuators can be provided in the supply and return air-side. These attenuators can be supplied with different sizes depending on the required sound level

Sound Attenuator



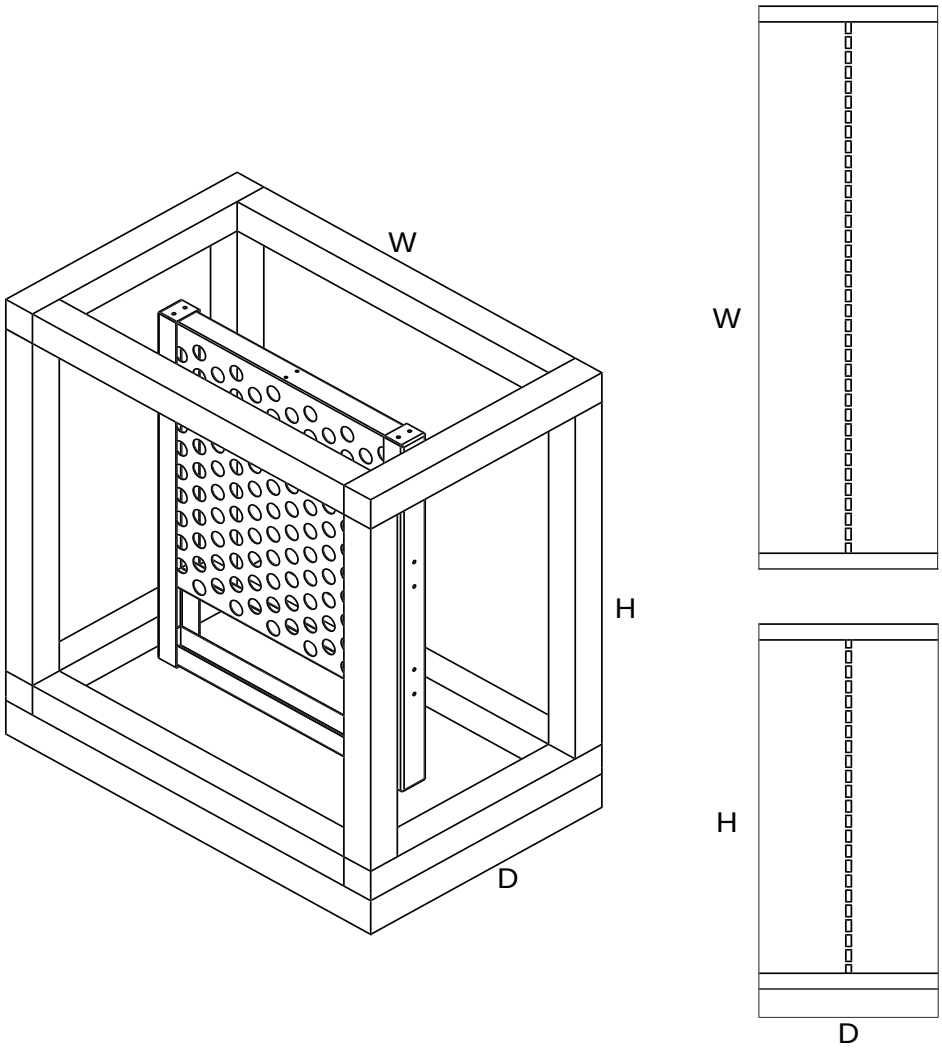


Model (PAH)			12		16		24		32		40		50		62		80	
W	mm	(inch)	850	(33.5)	850	(33.5)	1010	(39.8)	1420	(55.9)	1420	(55.9)	1420	(55.9)	1420	(55.9)	1760	(69.3)
H	mm	(inch)	800	(31.5)	800	(31.5)	960	(37.8)	960	(37.8)	960	(37.8)	1370	(53.9)	1370	(53.9)	1370	(53.9)
D	mm	(inch)	750	(29.5)	750	(29.5)	750	(29.5)	750	(29.5)	750	(29.5)	750	(29.5)	750	(29.5)	750	(29.5)

Model (PAH)			100		120		150		180		200		250		320		400		450	
W	mm	(inch)	2170	(85.4)	2170	(85.4)	2170	(85.4)	2170	(85.4)	2170	(85.4)	2740	(107.9)	3490	(137.4)	4060	(159.8)	4560	(179.5)
H	mm	(inch)	1370	(53.9)	1550	(61.0)	1870	(73.6)	2120	(83.5)	2280	(89.8)	2280	(89.8)	2280	(89.8)	2280	(89.8)	2280	(89.8)
D	mm	(inch)	750	(29.5)	750	(29.5)	750	(29.5)	750	(29.5)	750	(29.5)	750	(29.5)	750	(29.5)	750	(29.5)	750	(29.5)

Other Sections / Diffuser

This plate is provided when high face velocities exist especially when final-filters are provided in the air-handling unit, or in multizone and dual duct units to provide even air distribution between the hot and cold zones. Diffuser plate is made of heavy gauge galvanized steel perforated plate



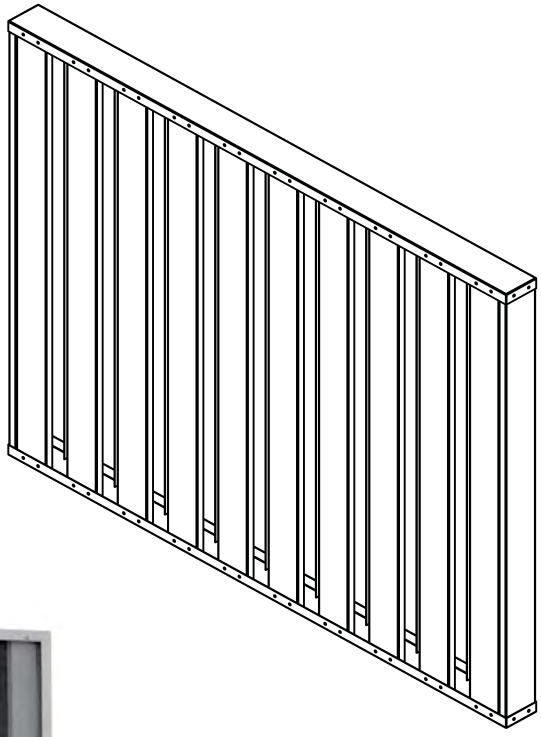
Model (PAH)			12		16		24		32		40		50		62		80	
W	mm	(inch)	850	(33.5)	850	(33.5)	1010	(39.8)	1420	(55.9)	1420	(55.9)	1420	(55.9)	1420	(55.9)	1760	(69.3)
H	mm	(inch)	800	(31.5)	800	(31.5)	960	(37.8)	960	(37.8)	960	(37.8)	1370	(53.9)	1370	(53.9)	1370	(53.9)
D	mm	(inch)	500	(19.7)	500	(19.7)	500	(19.7)	500	(19.7)	500	(19.7)	500	(19.7)	500	(19.7)	750	(29.5)

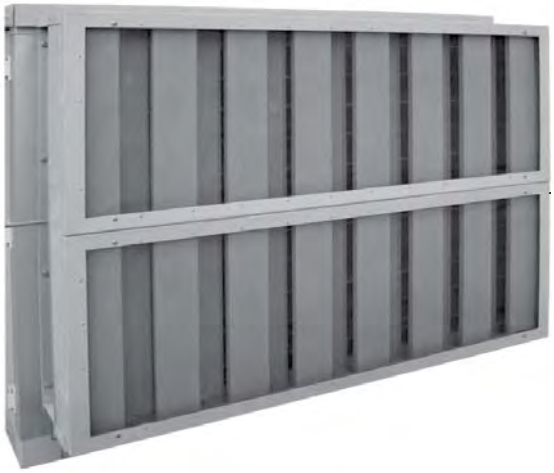
Model (PAH)			100		120		150		180		200		250		320		400		450	
W	mm	(inch)	2170	(85.4)	2170	(85.4)	2170	(85.4)	2170	(85.4)	2170	(85.4)	2740	(107.9)	3490	(137.4)	4060	(159.8)	4560	(179.5)
H	mm	(inch)	1370	(53.9)	1550	(61.0)	1870	(73.6)	2120	(83.5)	2280	(89.8)	2280	(89.8)	2280	(89.8)	2280	(89.8)	2280	(89.8)
D	mm	(inch)	750	(29.5)	750	(29.5)	750	(29.5)	750	(29.5)	960	(37.8)	960	(37.8)	960	(37.8)	960	(37.8)	960	(37.8)

Sections and Features

Other Sections / Sand Trap Louver

The Sand Trap Louver is constructed of heavy gauge galvanized steel with U-shape plates mounted and encased in a galvanized steel frame. These plates prevent the large particles from entering the air handling unit with the fresh air, and thus helps in prolonging filter life and the cleanliness of the air stream





Sand Trap Louver

Model (PAH)			12		16		24		32		40		50		62		80	
W	mm	(inch)	850	(33.5)	850	(33.5)	1010	(39.8)	1420	(55.9)	1420	(55.9)	1420	(55.9)	1420	(55.9)	1760	(69.3)
H	mm	(inch)	800	(31.5)	800	(31.5)	960	(37.8)	960	(37.8)	960	(37.8)	1370	(53.9)	1370	(53.9)	1370	(53.9)
D	mm	(inch)	100	(3.9)	100	(3.9)	100	(3.9)	100	(3.9)	100	(3.9)	100	(3.9)	100	(3.9)	100	(3.9)

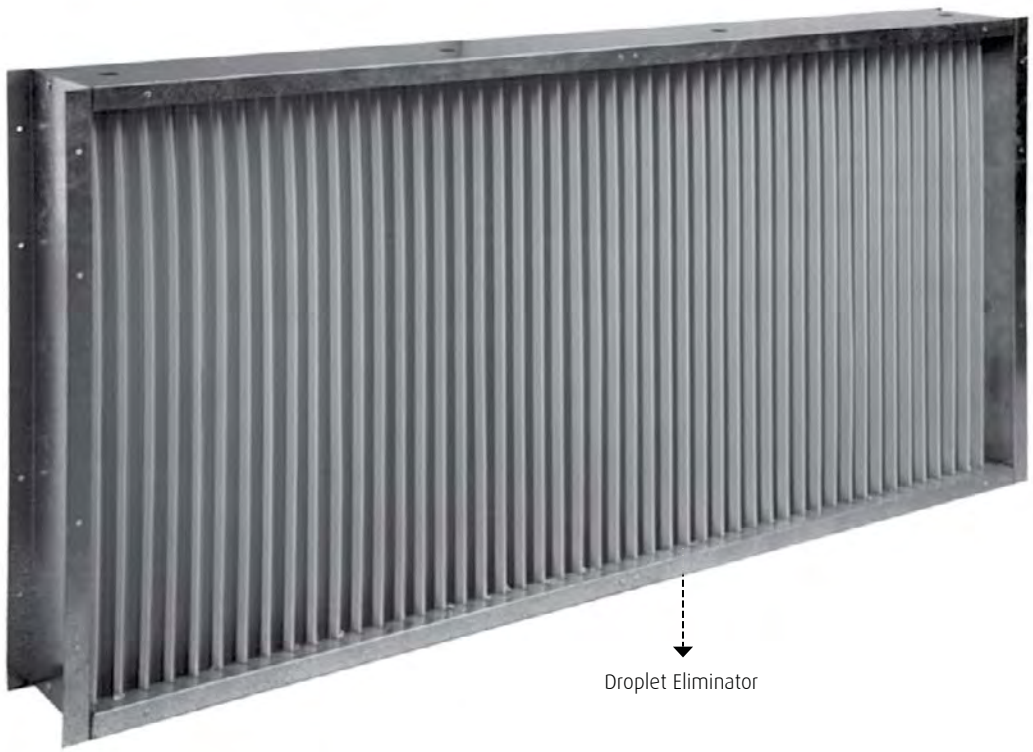
Model (PAH)			100		120		150		180		200		250		320		400		450	
W	mm	(inch)	2170	(85.4)	2170	(85.4)	2170	(85.4)	2170	(85.4)	2170	(85.4)	2740	(107.9)	3490	(137.4)	4060	(159.8)	4560	(179.5)
H	mm	(inch)	1370	(53.9)	1550	(61.0)	1870	(73.6)	2120	(83.5)	2280	(89.8)	2280	(89.8)	2280	(89.8)	2280	(89.8)	2280	(89.8)
D	mm	(inch)	100	(3.9)	100	(3.9)	100	(3.9)	100	(3.9)	100	(3.9)	100	(3.9)	100	(3.9)	100	(3.9)	100	(3.9)

Other Sections / Droplet Eliminator

To avoid water carry-over at high velocities, Petra recommends using a droplet eliminator in the unit. Eliminator blades are manufactured from reinforced polypropylene, encased within a galvanized steel frame, and designed to completely eliminate water carry over from cooling coils with minimal air pressure drop

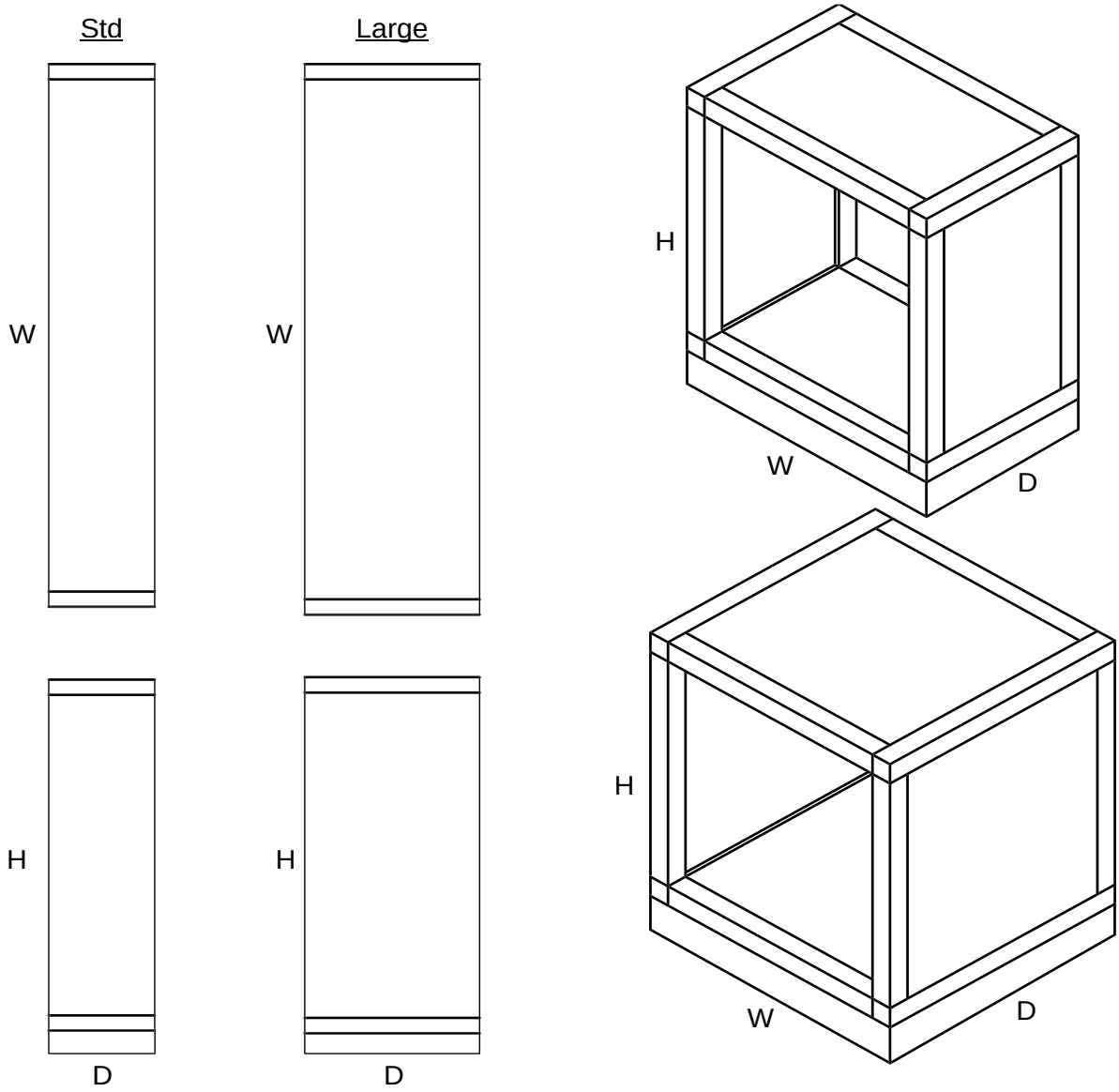
In most cases droplet eliminators are fitted within the cooling coil module, but droplet eliminator could be fitted anywhere inside the air handling unit if required

As an optional Petra provide aluminum eliminators



Sections and Features

Other Sections / Empty Section



Model (PAH)			12		16		24		32		40		50		62		80	
W	mm	(inch)	850	(33.5)	850	(33.5)	1010	(39.8)	1420	(55.9)	1420	(55.9)	1420	(55.9)	1420	(55.9)	1760	(69.3)
H	mm	(inch)	800	(31.5)	800	(31.5)	960	(37.8)	960	(37.8)	960	(37.8)	1370	(53.9)	1370	(53.9)	1370	(53.9)
D - Standard	mm	(inch)	500	(19.7)	500	(19.7)	500	(19.7)	500	(19.7)	500	(19.7)	500	(19.7)	500	(19.7)	500	(19.7)
D - Large	mm	(inch)	750	(29.5)	750	(29.5)	750	(29.5)	750	(29.5)	750	(29.5)	750	(29.5)	750	(29.5)	750	(29.5)

Model (PAH)			100		120		150		180		200		250		320		400		450	
W	mm	(inch)	2170	(85.4)	2170	(85.4)	2170	(85.4)	2170	(85.4)	2170	(85.4)	2740	(107.9)	3490	(137.4)	4060	(159.8)	4560	(179.5)
H	mm	(inch)	1370	(53.9)	1550	(61.0)	1870	(73.6)	2120	(83.5)	2280	(89.8)	2280	(89.8)	2280	(89.8)	2280	(89.8)	2280	(89.8)
D - Standard	mm	(inch)	500	(19.7)	500	(19.7)	500	(19.7)	500	(19.7)	500	(19.7)	500	(19.7)	500	(19.7)	500	(19.7)	500	(19.7)
D - Large	mm	(inch)	750	(29.5)	750	(29.5)	750	(29.5)	750	(29.5)	750	(29.5)	750	(29.5)	750	(29.5)	750	(29.5)	750	(29.5)

ELectrical / Electric Heater

Electric heaters are available in a wide range of capacities (kW and stages), they are mounted on the coil module to reduce unit footprint, and can be supplied in a stand alone section if required. Heaters are made of copper plated steel fins brazed to a steel tubular sheath which includes an 80/20 Nickel/Chrome resistance wire connected to terminals pins. The tubular sheath is filled with high quality compressed Magnesium oxide to ensure even heat distribution along the element. The terminal pins are insulated with ceramic bushes to isolate the element electrically and thermally from the casing. Auto and manual cutout is supplied as standard with the electric heaters

The following components will be supplied with the unit:

- Automatic safety cutout
- Manual safety cutout

Options:

- Contactor for each stage
- Power circuit breaker for each stage
- Air flow switch
- SCR modulating control

Electric Heater	Single Stage	2 Stages		3 Stages		
		1st	2nd	1st	2nd	3rd
kW	kW	kW	kW	kW	kW	kW
6	6	3	3	-	-	-
7.5	7.5	3	4.5	-	-	-
9	9	4.5	4.5	-	-	-
12	12	6	6	4.5	4.5	3
15	15	7.5	7.5	6	6	3
21	21	10.5	10.5	7.5	7.5	6
24	24	12	12	8	8	8
30	30	15	15	10.5	10.5	9
36	36	18	18	12	12	12
42	42	21	21	15	15	12
45	45	22.5	22.5	15	15	15
51	51	27	24	18	18	15
57	57	28.5	28.5	21	21	15
60	60	30	30	21	21	18
66	66	33	33	24	21	21
72	72	36	36	24	24	24
75	75	37.5	37.5	27	27	21

Note

- Electric heater with larger capacities are available, for more information please contact your nearest Petra sales office

Sections and Features

ELectrical / Bulk Head Light

Vapor proof bulkhead light can be provided as an optional feature for serviceable internal parts. The terminals for these lights might be with switches or without

This optional feature will be useful to carry out any service or maintenance procedures at any time (Day or Night)

ELectrical / Ultraviolet Light

This optional feature equipped in the unit to inactivate airborne microbes (bacterial, and fungal contamination). These lamps are extensively utilized in health care centers like hospitals, biological laboratories and pharmaceutical applications.

These lamps are installed inside HVAC Systems making impossible conditions for the organisms to survive and killing all microbial mold and fungus that causes foul odors. The lamp acts as an air purifier and as a deodorizer and achieves a very high level of purification for indoor air

ELectrical / Variable Frequency Drive (VFD)

This optional feature is to provide factory pre-wiring to the motor(s) terminals to a solid-state variable frequency drive, to control the motor speed through modulating electrical signal. This VFD is encased in metal box to protect it from tampering unauthorized personnel

Variable Frequency Drive

ELectrical / Control Panel

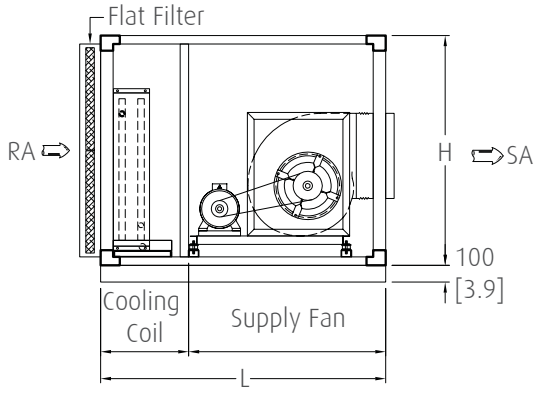
- NEMA 3R minimum panel enclosure
- Panel door has a door retainer to keep door open during service
- Wiring diagram laminated copy is inserted in door pocket
- Control panel is attached to the unit only when microprocessor controller is required

Control Panel

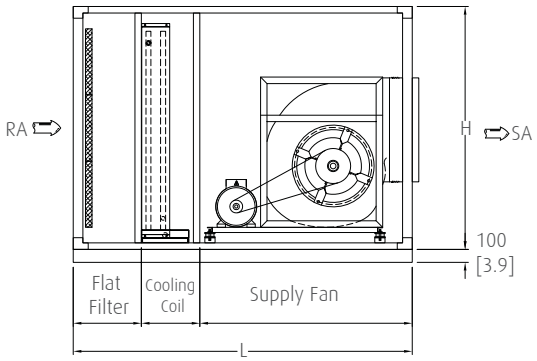
Standard Sections Dimensions

Flat Filter + Coil + Fan

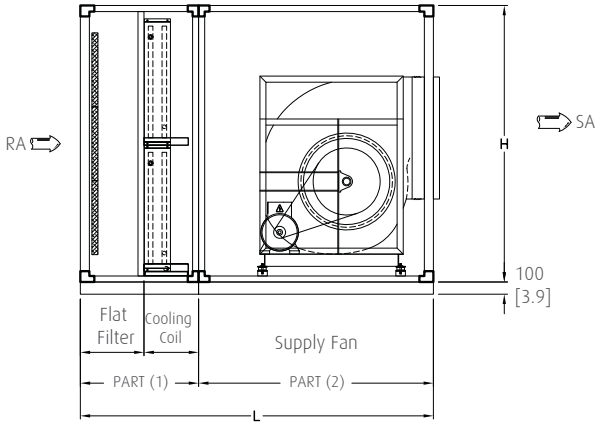
(PAH 12 - PAH 100)



(PAH 120 - PAH 200)



(PAH 250 - PAH 450)

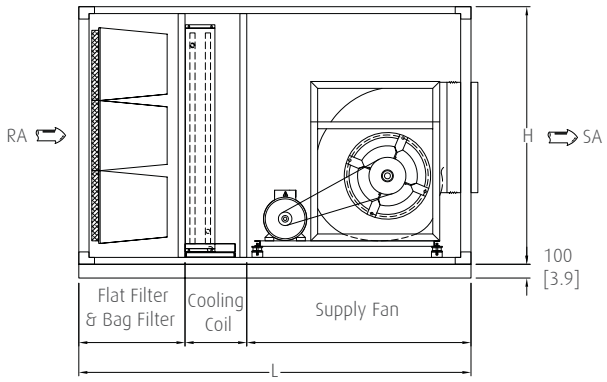


	W		H		L	
	mm	(inch)	mm	(inch)	mm	(inch)
12	850	33.5	800	31.5	1450	57.1
16	850	33.5	800	31.5	1450	57.1
24	1010	39.8	960	37.8	1450	57.1
32	1420	55.9	960	37.8	1700	66.9
40	1420	55.9	960	37.8	1700	66.9
50	1420	55.9	1370	53.9	1700	66.9
180	2170	85.4	2120	83.5	2610	102.8
200	2170	85.4	2280	89.8	2610	102.8
250	2740	107.9	2280	89.8	2910	114.6
320	3490	137.4	2280	89.8	2910	114.6
400	4060	159.8	2280	89.8	3150	124.0
450	4560	179.5	2280	89.8	3150	124.0

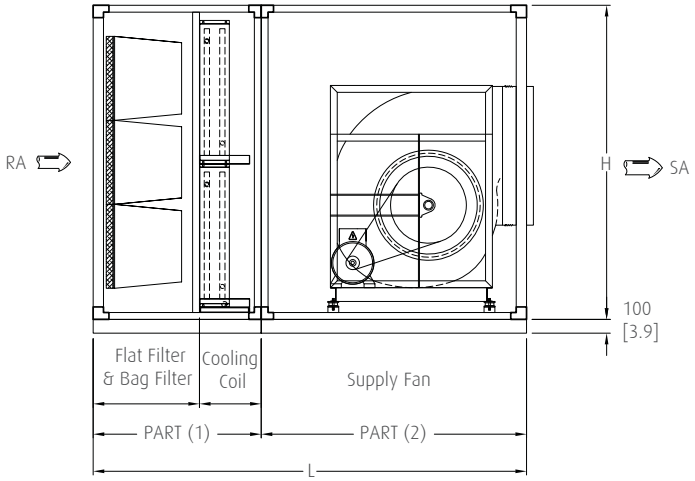
- Add 250 mm (10 Inch) in length for (8) rows coil with 5/8" pipe diameter
- Add 250 mm (10 Inch) in length for DX coil with (6) rows and more
- For outdoor units installation roof cover added on unit top

Flat Filter & Bag Filter + Coil + Fan

(PAH 12 - PAH 200)



(PAH 250 - PAH 450)



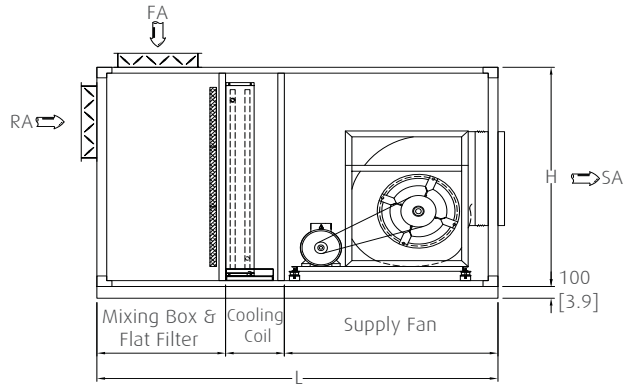
	W		H		L	
	mm	(inch)	mm	(inch)	mm	(inch)
12	850	33.5	800	31.5	2150	84.6
16	850	33.5	800	31.5	2150	84.6
24	1010	39.8	960	37.8	2150	84.6
32	1420	55.9	960	37.8	2400	94.5
40	1420	55.9	960	37.8	2400	94.5
50	1420	55.9	1370	53.9	2400	94.5
180	2170	85.4	2120	83.5	2860	112.6
200	2170	85.4	2280	89.8	2860	112.6
250	2740	107.9	2280	89.8	3160	124.4
320	3490	137.4	2280	89.8	3160	124.4
400	4060	159.8	2280	89.8	3400	133.9
450	4560	179.5	2280	89.8	3400	133.9

- Add 250 mm (10 Inch) in length for (8) rows coil with 5/8" pipe diameter
- Add 250 mm (10 Inch) in length for DX coil with (6) rows and more
- For outdoor units installation roof cover added on unit top

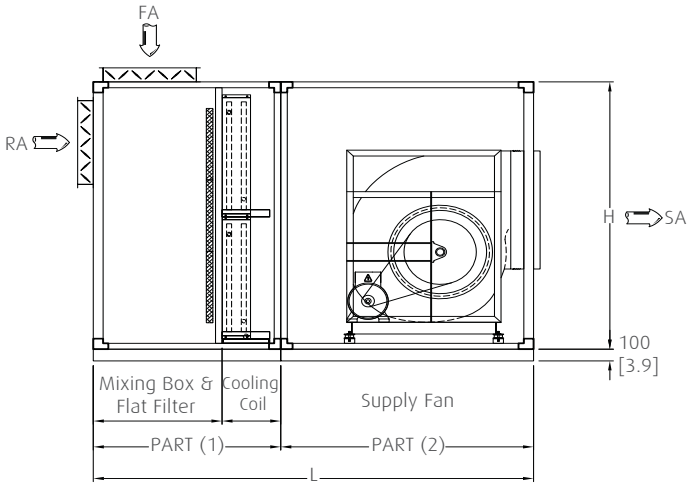
Standard Sections Dimensions

Mixing Box & Flat Filter + Coil + Fan

(PAH 12 - PAH 200)



(PAH 250 - PAH 450)

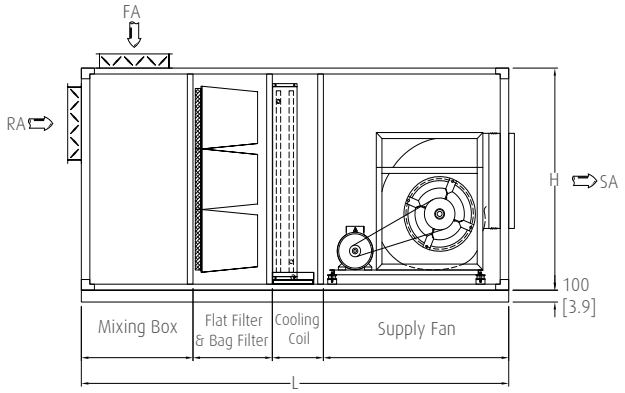


	W		H		L	
	mm	(inch)	mm	(inch)	mm	(inch)
12	850	33.5	800	31.5	1900	74.8
16	850	33.5	800	31.5	1900	74.8
24	1010	39.8	960	37.8	1900	74.8
32	1420	55.9	960	37.8	2150	84.6
40	1420	55.9	960	37.8	2150	84.6
50	1420	55.9	1370	53.9	2400	94.5
180	2170	85.4	2120	83.5	3070	120.9
200	2170	85.4	2280	89.8	3070	120.9
250	2740	107.9	2280	89.8	3370	132.7
320	3490	137.4	2280	89.8	3610	142.1
400	4060	159.8	2280	89.8	3860	152.0
450	4560	179.5	2280	89.8	3860	152.0

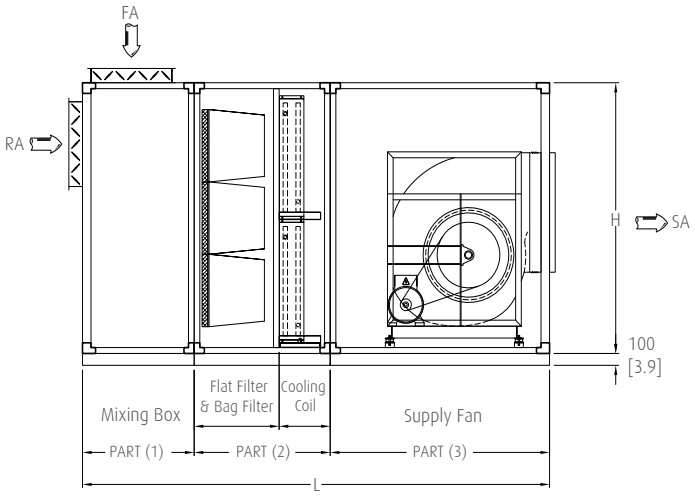
- Add 250 mm (10 Inch) in length for (8) rows coil with 5/8" pipe diameter
- Add 250 mm (10 Inch) in length for DX coil with (6) rows and more
- For outdoor units installation roof cover added on unit top

Mixing Box + Flat Filter & bag Filter + Coil + Fan

(PAH 12 - PAH 200)



(PAH 250 - PAH 450)

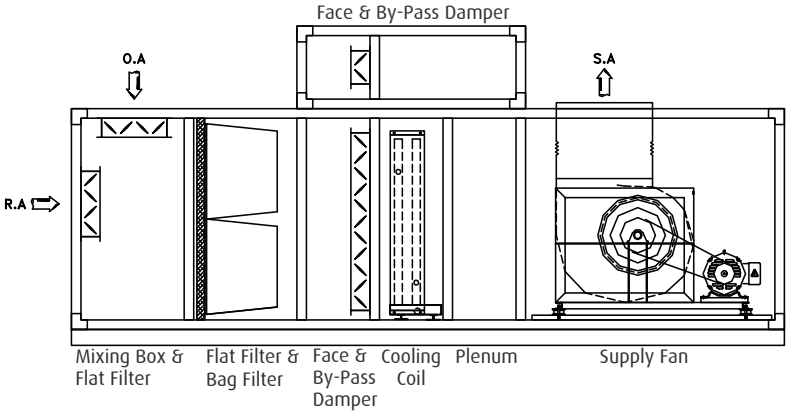


	W		H		L	
	mm	(inch)	mm	(inch)	mm	(inch)
12	850	33.5	800	31.5	2600	102.4
16	850	33.5	800	31.5	2600	102.4
24	1010	39.8	960	37.8	2600	102.4
32	1420	55.9	960	37.8	2850	112.2
40	1420	55.9	960	37.8	2850	112.2
50	1420	55.9	1370	53.9	3100	122.0
180	2170	85.4	2120	83.5	3770	148.4
200	2170	85.4	2280	89.8	3770	148.4
250	2740	107.9	2280	89.8	4120	162.2
320	3490	137.4	2280	89.8	4370	172.0
400	4060	159.8	2280	89.8	4610	181.5
450	4560	179.5	2280	89.8	4610	181.5

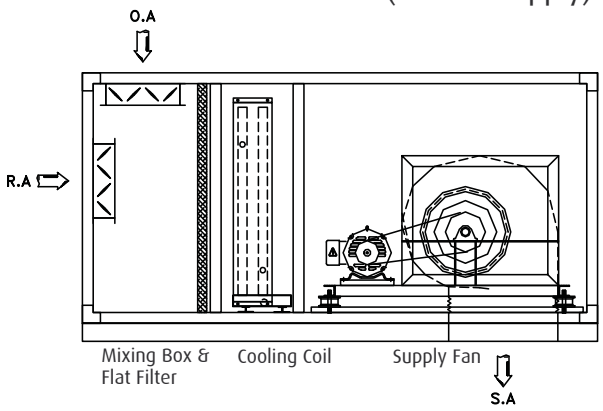
- Add 250 mm (10 Inch) in length for (8) rows coil with 5/8" pipe diameter
- Add 250 mm (10 Inch) in length for DX coil with (6) rows and more
- For outdoor units installation roof cover added on unit top

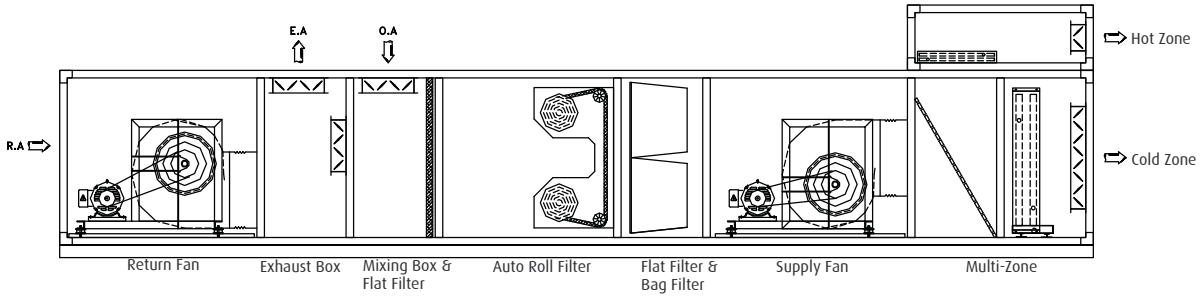
Unit Arrangements (Random)

(Top Supply)

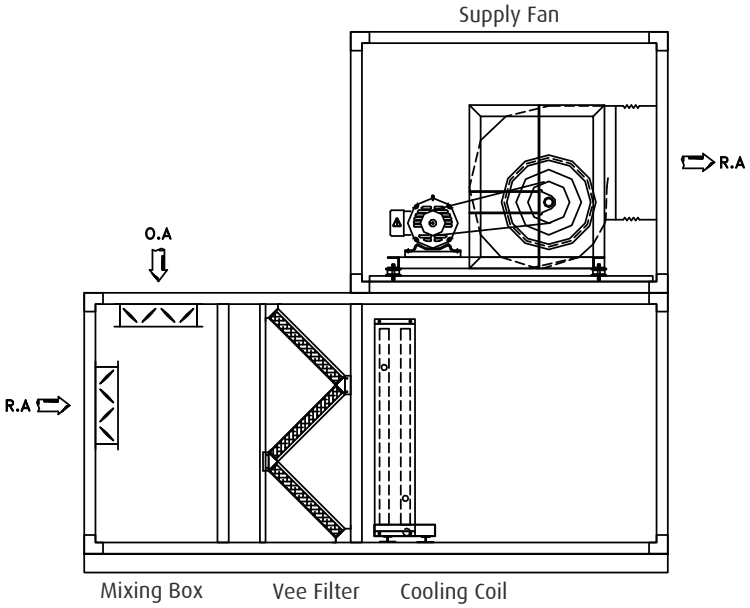


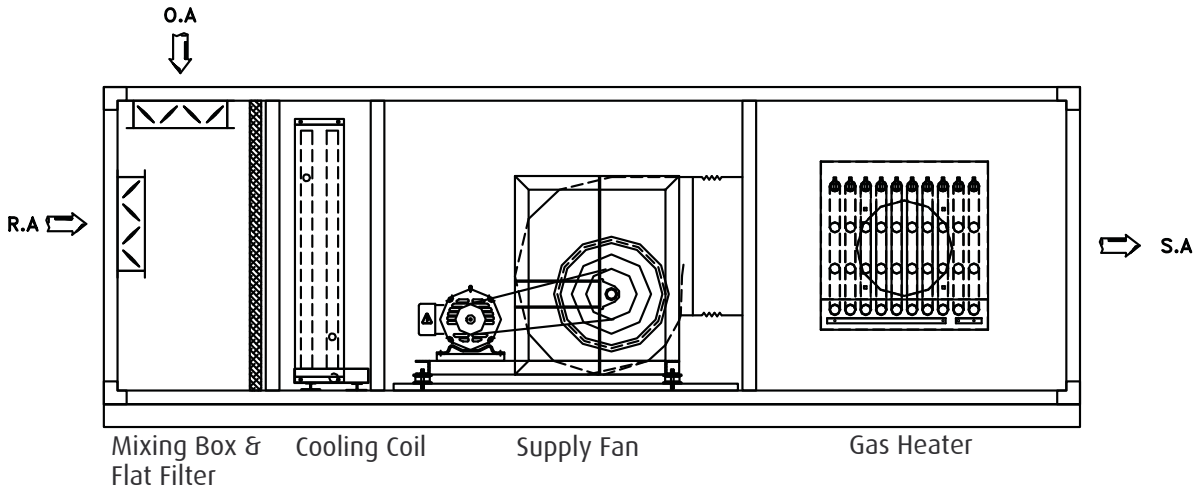
(Bottom Supply)





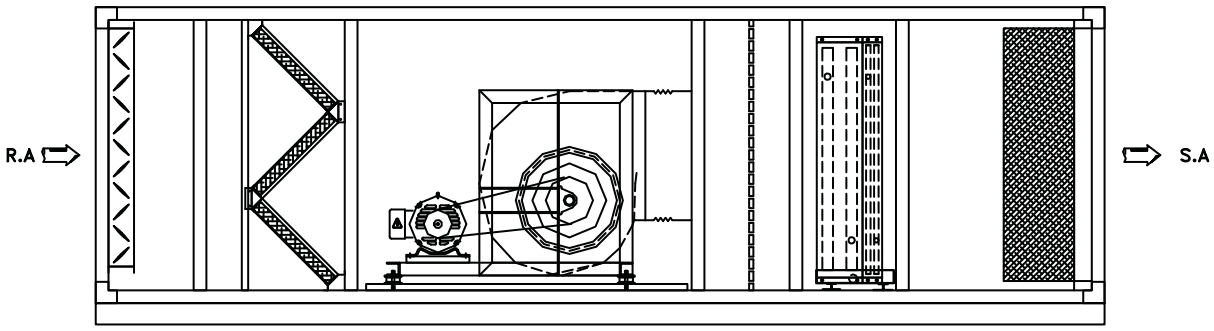
For more arrangements, Please contact your nearest Petra sales office

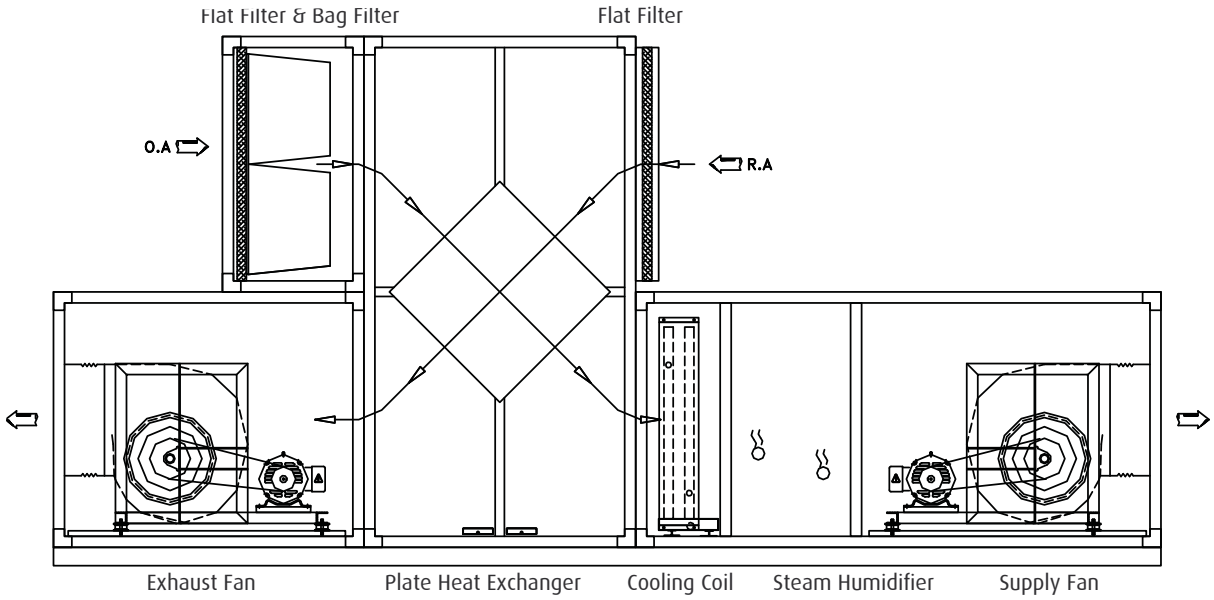




For more arrangements, Please contact your nearest Petra sales office

Unit Arrangements (Random)





Microprocessor Controller

Introduction

Petra Air Handling Unit Controller is a complete solution for the control of air handling units. It comprises the latest technologies in communication and design and replaces traditional hard-wired solutions

All system configuration and plant applications is performed via a user-friendly Web interface, which makes installation and commissioning a piece of cake

Main Features

The main features of the controller are as following:

1- Cost-effective cabling:

All peripheral units are connected to the master via a Modbus cable. This enables the system to be wired in a simple manner while retaining full control of all sub-units. This unique solution makes the system very cost- effective in installation, verification and commissioning

2- Connectivity:

The controller can be connected to a variety of systems: Modbus RTU, Modbus TCP/IP, internal Web server, BACNET and LON

3- User Friendly system:

You can deal with it in very simple manner since there more graphics than texts

4- Software upgrade via SD memory card

5- Focus on user-friendliness:

The carefully developed intelligent design of Master controller ensures a unique level of user-friendliness. The built-in web server, with 3 individual user-specific information levels which only provide users with the information they require, makes system operation simple, easy and user-friendly

6- Versatile and economically attractive solution:

Master controller provides a future proof, flexible and user- friendly solution which saves time and costs and which, through the unit's intelligent user interface, is easy to implement, operate and maintain. Master provides optimal reliability and therefore the lowest possible levels of energy consumption

Microprocessor Controller

Components of the system

1- Master Controller:

The Master controller handles all processing and communication into and out of the system. It contains various interfaces for peripheral units, allowing sensors, pumps and valves to be connected to the master

2- Keypad:

The Keypad, with its unique "Push & Turn" dial and graphical back-lit LCD, gives service technicians full control and surveillance of system operations

3- Fan Controller:

The Fan Controller measures air flow and perform filter surveillance. The Fan Controller can also control various sensors, alarm systems and actuators for heating and cooling systems or dampers

4- Controller for rotary heat exchanger:

The RHX controller and associated step motor regulate the Rotary heat exchanger and are fully integrated via Modbus

5- Temperature Sensors:

PT-1000 temperature sensors are suitable for this system

6- Touch Room HMI:

Touch Room HMI is a user-friendly control panel for installation within an air handling unit or on the wall in a room. The panel is used together with the master controller. It is used for the commissioning and everyday operation of the air handling unit and in connection with service. All system values can be seen while the settings are password protected

Fan control modes:

The fan is controlled based on a variety of modes:

1. Constant air flow
2. Constant air pressure
3. Supply air pressure w.slave
4. Exhaust air pressure w.slave
5. Constant CO_2
6. Low speed / high speed (recirculation)
7. Constant operation
8. Automatic operation

Temperature control modes:

1. Constant supply air temperature
2. Constant exhaust air temperature
3. Constant room temperature
4. Constant supply/exhaust differential temperature

BMS Interface

BMS Connectivity:

The unit's controller shall be capable to connect to a variety of BMS Protocols such as:

1. Modbus RTU
2. Modbus TCP/IP
3. BACnet TCP/IP
4. LON

System's Points to be read on BMS:

Below are the AHU sections and the below mentioned points shall be taken from the controller to the BMS system.

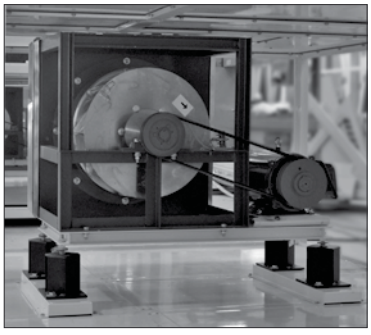
R/W: Read / Write Value
R: Read Value
AV: Analogue Value
DV: Digital Value

Readings for Sections

1. Supply Fan section:

In this section the following points and information shall be read:

NO.	Name	Type	I/O Type
1	Actual supply air temperature	AV	R
2	Supply Temperature set point	AV	R/W
3	Actual supply duct pressure. Set point of the supply duct	AV	R
4	pressure	AV	R/W
5	Actual Supply air volume	AV	R
6	Set point of the supply air volume	AV	R/W
7	The actual percentage at which the supply fan motor is operating (0-100%)	AV	R



2. Exhaust Fan section:

In this section the following points and information shall be read:

NO.	Name	Type	I/O Type
1	Actual Exhaust air temperature	AV	R
2	Actual Exhaust duct pressure	AV	R
3	Set point of the Exhaust duct pressure	AV	R/W
4	Actual Exhaust air volume	AV	R
5	Set point of the Exhaust air volume	AV	R/W
6	The actual percentage at which the Exhaust fan motor is operating (0-100%)	AV	R

3. Energy wheel section:

In this section the following points and information shall be read:

NO.	Name	Type	I/O Type
1	The percentage at which the energy wheel operate	AV	R

4. Humidifier section:

In this section the following points and information shall be read:

NO.	Name	Type	I/O Type
1	Actual Relative Humidity of the supply air steam	AV	R
2	Actual Relative Humidity of the return air stream	AV	R
3	The percentage at which the steam humidifier operate	AV	R
4	Humidifier Alarm	DV	R

The controller should be able to control the relative humidity to keep it constant through humidification (if the actual humidity is lower than the humidity set point) and de-humidification (if the actual humidity is greater than the humidity set point). Such that in the humidification mode, a start signal is sent to the steam humidifier to energize it with a ratio proportional to how the actual humidity far away from the humidity set point, while in the de-humidification mode, the humidifier is de-energized and the cooling valve is opened to deep cool the air and hence removing the humidity from it

BMS Interface

5. Chilled water and hot water coils section:

In this section the following points and information shall be read:

NO.	Name	Type	I/O Type
1	The Actual Opening of the chilled water valve	AV	R
2	The Actual Opening of the hot water coil's valve	AV	R
3	The Temperature of the Hot Water coil	AV	R

water valves are connected to each of chilled and hot water coils , these valves can be 2-way valves or 3-way valves the controller should able to control both types

6. Inlet Filter Section:

In this section the following points and information shall be read:

NO.	Name	Type	I/O Type
1	Inlet Filter Pressure	AV	R
2	Inlet Filter Alarm Limit	AV	R
3	Outside Air Temperature Reading	AV	R

7. Return Filter Section:

In this section the following points and information shall be read:

NO.	Name	Type	I/O Type
1	Return Filter Pressure	AV	R
2	Return Filter Alarm Limit	AV	R
3	Return Air Temperature Reading	AV	R

8. Economizer and mixing box dampers:

The controller should support the economizer and mixing box dampers for both dry and enthalpy modes such that free cooling is employed whenever the outdoor temperature or enthalpy is at certain value

Petra Graphical Touch Screen [Optional]

Touch screen is an extremely high-tech user interface, with high resolution, and a microprocessor that allows the management of complex graphic images. It also displays animated icons, non-proportional fonts in Unicode format, humidity, pressure values and air speed. The touch screen function makes it easy for the user to manage more complex installation diagrams. A keypad on the side of the display can be used in all applications where the touch screen is not the preferred choice

Smart Watch Solution (Optional)

Introduction

Petra introduces the next generation of its control solutions: Smart Watch. Smart Watch is designed to make the interaction between user and HVAC units simpler and easier. Smart Watch centralizes the monitoring, operations and management of the HVAC system to achieve more efficient operations. Smart Watch has become an essential part of a modern HVAC system that contributes significantly to the savings potential and function of the building

Smart Watch Solution (Optional)

Benefits of Using Smart Watch

- **Time Saving**

  Through smart watch, you can monitor, control and operate a large HVAC system from one central location. Viewing all system alarms from one location with the ability to reset them. This reduces troubleshooting time and man-hours

- **Monitoring**

  Creating a data logger for any variable in the system (return temperature, supply temperature, return humidity, flow rate, pressure...etc.)

  Monitor the status of the unit devices (compressor, heater, humidifier, valve, and damper). This enables engineers and technicians to achieve a better understanding of their building and/or plant

- **Flexibility**

  The smart watch will give you the flexibility to change the set points for any unit, enable/ disable any unit, heating/cooling selection for any unit and duty/standby functionality with time scheduling

- **Cost Reduction**

  Using the network and serial communication dramatically reduce cabling and installation between units

- **Reporting**

  Excel sheets can be created that show the system`s behavior such as alarms log, temperatures, humidity...etc. and send them by email daily, weekly...etc.

- **Graphical Analysis**

  You can get trends showing the temperature, humidity...etc. variations over a pre-set time period

- **Alarms Management & Notifications**

  Unit`s alarms can be fully monitored and reported in a user-friendly manner. All alarms can be sent via e-mail or mobile. Alarms can be automatically classified as high priority and low priority

- **PC and Mobile WEB Interface**

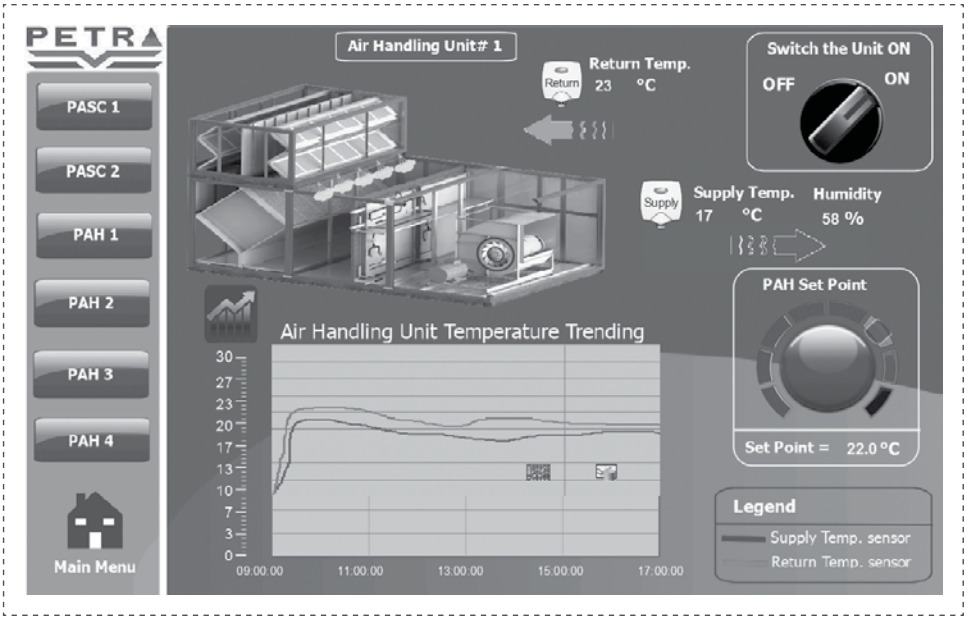
  Using your Smart Phone or Tablet, you can control the system remotely

Smart Watch Features

- Compatible with BMS system
- Compatible with SCADA system
- Touch screen up to 13.3"
- Providing full details about your system
- Ability to control multi HVAC units in your system (chillers, package units, air handling units, close control units, ducted split units, fan coil units, exhaust fans...etc.)
- Using the Smart Watch, you can now exploit a new platform of services using the latest technologies available in the market and widely used in other applications
- Cloud computing, wireless connectivity & internet of things (IOT) in the HVAC units becomes a reality with this smart control system
- Security of the communications and data is the most top priority
- All systems will be secure with very well-known strong security methods
- Improve customer service levels through faster troubleshooting

Smart Watch Insight

User friendly management station for the control, monitoring and analyzing for all integrating HVAC systems



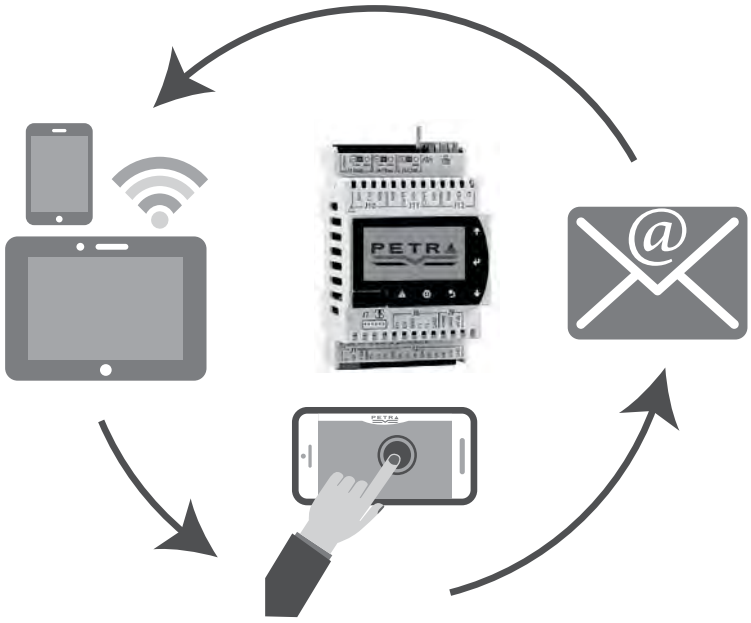
Smart Watch Solution (Optional)

Web User Interfaces

Through this system, you can control your units through BMS, your smart phone or any hand help device

Also, through this system you will be able to send information through email alerts

You will be able to send the type of problem through an email alert



Technical Specifications

Power Supply	220-240Vac/1Ph/60Hz
Touch Keypad Type	TFT
Touch Keypad Resolution	800 x 1280, WVGA
Operating Temperature	0ºC to 50ºC
Storage Temperature	-20 ºC to 70 ºC
Operating and Storage Humidity	5 to 85% relative humidity
Interfaces	Modbus Port / USB Port